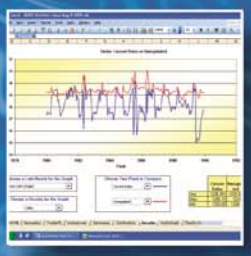
Shared Vision Planning

November 2009

Performance Measures to Assess the Benefits of Shared Vision Planning and Other Collaborative Modeling Processes

2009-R-07



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Shared Vision Planning

The Shared Vision Planning program at the Institute for Water Resources (IWR) uses an innovative, collaborative approach to solve water resources management issues. It integrates traditional water resources planning methods, structured public participation, and collaborative computer modeling into a multifaceted planning process. This program is unique because it emphasizes public involvement in water resources management and the use of collectively developed computer models along with tried-and-true Corps planning principles.

Shared Vision Planning aims to improve the economic, environmental and social outcomes of water management decisions. By involving stakeholders throughout the planning process, the Shared Vision Planning process can facilitate a common understanding of a natural resource system and help stakeholders reach a management consensus that satisfies multiple interests. Shared Vision Planning allows IWR scientists to work directly with stakeholders to find acceptable solutions to issues surrounding the management of water resources.

Collaborating for Improved Water Resources Management

Through its Shared Vision Planning Program, IWR is applying the principles of public involvement and collaborative computer modeling to a series of water resources management case studies across the United States. Analyses, documents, and an enhanced web presence are being developed to impart the method and lessons of Shared Vision Planning to the wider planning community. All of these initiatives are designed to help planners and stakeholders use a collaborative approach to natural resources management.

By recognizing the importance of multiple stakeholder interests and the value of innovative technological support, Shared Vision Planning can make a positive impact on the current and future management of our nation's water resources. The Shared Vision Planning Program at IWR is developing partnerships with other organizations to more effectively implement this approach. The Program has already helped numerous stakeholders in previous projects to find acceptable water management solutions, and IWR looks forward to the continued spread and success of this planning approach.

For further information on the Shared Vision Planning program, please contact Hal Cardwell, 703-428-9071, Hal.E.Cardwell@usace.army.mil.

To learn more, please visit the Shared Vision Planning web site: www.svp.iwr.usace.army.mil

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US Army Corps of Engineers®

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IWR Shared Vision Planning Publication Series

This following report is part of IWR's Shared Vision Planning publication series. Publications in this series serve two primary purposes: (1) To provide general information about what Shared Vision Planning is and recommendations on how best to apply it, and (2) To document case studies and research to advance the field. This report serves the second purpose. The other publications in this series are categorized as the following:

Case Studies and Research to Advance the Field

Michaud, W. 2009. Performance Measures to Assess the Benefits of Shared Vision Planning and Other Collaborative Modeling Processes. IWR Report 09-R-7.

Creighton J. and Langsdale, S. 2009. Analysis of Process Issues in Shared Vision Planning Case Studies. IWR Report 09-R-05. *Summarizes process documentation in Shared Vision Planning cases to date, and provides guidance for future case study authors.*

Stephenson, K., Shabman, L., Langsdale, S., and Cardwell, H. 2007. Computer Aided Dispute Resolution: Proceedings from the CADRe Workshop. IWR Report 07-R-6. *A definitional paper, eight case studies, and documentation of working group efforts.*

Imwiko, A., Kiefer, J.C., Werick, W.J., Cardwell, H.E., and Lorie, M.A. 2007. Literature Review of Computer Aided Collaborative Decision Making. IWR Report 2007-R-01. *An annotated bibliography for 52 case studies that used a computer model in a collaborative decision making process.*

Lorie, M. 2006. Shared Vision Planning Applied to Regulatory Decisions. IWR White Paper, dated July 31, 2006. *Discusses Shared Vision Planning and its relation to the Corps' regulatory role under Section 404 of the Clean Water Act.*

Guidance on Applying Tools and Leading Processes

For those looking for basic information about what Shared Vision Planning is, as well as guidance on how to conduct a Shared Vision Planning process, IWR has available:

Creighton, J. *in review.* A Guide to Conducting a Shared Vision Planning Process. *A complete manual for those who are leading the process.*

Cardwell, H., Langsdale, S. and Stephenson, K. 2009. A Shared Vision Planning Primer. IWR Report 08-R-02. *Introduces the reader to the three pillars of Shared Vision Planning, and how it can help address current challenges in water resources decision making today.*

Lorie, M. 2006. A short guide to interactive decision support tools using Microsoft Excel. IWR Report 06-R-02. *A primer that describes how Excel can support a collaborative modeling process.*

All of the above reports were published by IWR and are available at:
www.sharedvisionplanning.us or www.iwr.usace.army.mil/inside.

Additional materials have been developed, including conference proceedings papers, journal articles, fact sheets, and brochures, some of which are also available at www.sharedvisionplanning.us.

Relationship to the ADR Publication Series

This series parallels documents published by the Conflict Resolution and Public Participation Center of Expertise (CPC) at IWR, of which the Shared Vision Planning program is a part. Most notably is the Alternative Dispute Resolution (ADR) series that includes newly updated reports on Techniques, Case Studies, and White Papers.

Future Work

The above documents lay the foundation for contributions to other work that is currently in progress by the Shared Vision Planning program. Documents in process include:

- A book on Computer Aided Dispute Resolution that builds on the 2007 Proceedings (Expected 2010)
- A Best Practices for Collaborative Modeling monograph, being generated through an ASCE Environmental Water Resources Institute Task Committee (Expected 2011)
- As a companion to Michaud (2009; IWR Report 09-R-7), A guide to reporting Collaborative Modeling survey data, with an emphasis on how to synthesize the results of the survey.

The completed publications in this series to date all focus on the use of Shared Vision Planning; however, the Shared Vision Planning program is broadening our focus to include other technical tools that can support Environmental Conflict Resolution processes. Therefore, future documents may address a wider array of tools.

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Introduction

Collaborative modeling has evolved as an approach to support water resources planning since the Institute for Water Resources (IWR) pioneered the Shared Vision Planning (SVP) approach in the early 1990s through the National Drought Study[1]. To date, however, the benefits of collaborative modeling and similar approaches have not been explicitly evaluated. In 2007, IWR set out to develop performance measures to address this need. The following report summarizes the work that has been completed to develop a suite of performance measures. The report presents background information on SVP and collaborative modeling processes, describes the activities conducted to identify performance measures, describes the measures, and discusses methodological considerations for applying the measures retrospectively and prospectively to evaluate the benefits of collaborative modeling in completed and active cases.

The work has been conducted by SRA International, Inc. under contract with the Louis Berger Group Inc., for the U.S. Army Corps of Engineers Institute for Water Resources under Contract No. W912HQ-04-D-008, Delivery Order No. 0017.

Background

Shared Vision Planning is a modification of the traditional water resources management approach. SVP integrates three "pillars" for resolving water resources problems: traditional water resources planning, structured public participation, and integrated computer modeling. The defining characteristics of the SVP approach include:[2]

- Promotion of an interest-based negotiating and decision-making environment by emphasizing the fundamental objectives of the stakeholders, and intensively and iteratively engaging them throughout the process.
- Incorporation of a traditional planning approach to protect the broad public interest and prevent undue influence by well-organized interest groups.
- Use of a collaboratively-built systems model that fosters a common understanding of the facts, and assistance in comparing multiple alternatives.
- Integration of technical analysis across stakeholder interests, allowing collaborative learning about goals, objectives, constraints and alternatives.
- Transparency throughout the entire process to encourage understanding and shared learning.

[1] Werick, W.J. and W. Whipple, Jr. 1994. National Study of Water Management During Drought: Managing Water for Drought. IWR Report 94-NDS-08.
[2] Page 22 in Palmer, R.N., H.E. Cardwell, M.A. Lorie, and W.J. Werick. Unpublished Draft. Disciplined Planning, Structured Participation, and Collaborative Modeling: Applying Shared Vision Planning.

A basic characteristic of SVP, and the focus of this study, is the use of collaborative modeling. Collaborative modeling techniques have evolved from several different fields. Integrated assessment literature refers to "participatory modeling," in fields such as policy analysis and organizational learning, as well as natural resource applications such as water resources and land management. The system dynamics community uses the term "group model building" and the ecological economics community uses the term "mediated modeling" to describe a conceptually similar approach. SVP is a formulation of this broader set of methods that has been applied by the Institute for Water Resources exclusively to water resources management applications.[3] The core characteristic of all of these approaches is that stakeholders are involved in not only the use of the model but in its actual development.

One unique characteristic of Shared Vision Planning is the use of "Circles of Influence" to structure the stakeholder participation. Circle A includes those who actually build the computer model. Circle B are people actively engaged in model development through collaborating on what should be included and through validating model updates. Circle C includes all other interested parties who may be affected by the decision. These parties observe the process through updates and may provide input via outreach activities or through their representative in Circle B. Circle D includes the decision makers, whose participation is vital to developing recommendations that are politically acceptable. Ideally, they will be engaged throughout; however, at minimum, they will play an important role at the later stages.

Proponents of collaborative modeling suggest that it can provide an effective mechanism for resolving impasses that cannot be resolved through more traditional planning and other decision processes. Collaborative modeling is expected to provide a useful tool for communicating competing interests and trade-offs among alternatives, increase awareness and understanding of the interests involved, and build cooperation among stakeholders. These effects are expected to result in better, consensus-oriented decisions as well as sustained interaction among group members and tools that support institutional learning and change and adaptive management.[4]

Collaborative modeling is often employed in situations where disputes have escalated to a point where a new approach is required. Thus, because collaborative modeling is often applied in difficult cases, it is hard to judge whether up-front investments increase or reduce costs and duration relative to the alternative. Proponents of collaborative modeling suggest that while collaborative processes may require greater up-front investment, the outcomes of these processes are ultimately improved relative to more traditional approaches, and implementation of selected alternatives or policies may be easier to implement.

Research Questions

While the benefits of collaborative modeling and similar processes have been experienced by those who have participated in them, these benefits have not been explicitly and systematically evaluated, nor documented. The objective of this study was to develop a suite of performance

[3] Langsdale, Stacy M. 2007. Participatory model building for exploring water management and climate change futures in the Okanagan Basin, British Columbia, Canada. Thesis, University of British Columbia, April.
[4] van den Belt, M. 2004. Mediated Modeling. Island Press.

measures to collect data and evaluate empirical evidence of the benefits of collaborative modeling with respect to not only the satisfaction of participants in the process or whether an agreement was reached, but also in terms of the quality of water resource management actions.

Specifically, the suite of performance measures was developed to address two types of questions, one summative and one formative:

- What are the benefits of collaborative modeling? How can these benefits be measured?
- What approaches to collaborative modeling are most effective under specific circumstances? What are the most important variables to recognize and control for in process design and implementation?

The Institute for Water Resources hopes that by establishing a suite of performance measures to systematically collect data regarding collaborative planning and modeling processes, they can build up a sufficient body of evidence to address these questions. It is hoped that this evidence will be useful for government agencies to better assess trade-offs between collaborative processes and the status quo and make smart investments when circumstances suggest that collaborative processes might be warranted. It is also hoped that the performance measures will provide insights that will help practitioners to better tailor collaborative processes to specific circumstances and identify and mitigate potential threats to the success of collaborations that are underway.

Development of Performance Measures

SRA used a theory-driven approach incorporating existing methodological work to identify a suite of performance measures intended to work together and efficiently address key research questions. SRA used a logic modeling approach to create a framework to map different tools and actions to immediate, intermediate, and end outcomes. The logic model was then used to identify critical performance measures, and a survey was developed to be used as an instrument to collect data in support of these measures. The survey was tested using retrospective case study analysis, and the survey and suite of performance measures were modified based on the case study feedback.

The following section describes the approach and presents the results of logic modeling, survey development, and case study analysis activities.

Logic Modeling

A logic model describes how a process is intended to work (i.e., the "process logic") in terms of the activities that constitute the process and the outcomes that are intended to be achieved based on those activities. Logic models start by defining the inputs to a process, which can include the resources invested and actions taken. They then show how those inputs translate into outputs, such as models or recommendations produced, which then translate into outcomes. Outcomes

are typically described at varying levels, from close-in to more distal outcomes. The ultimate outcomes of a process can range from narrow, well-defined outcomes, such as whether an agreement was reached, to more broadly defined outcomes, such as whether societal utility is maximized.

Choices regarding outcomes to include in a logic model are tailored to the specific process, where ultimate outcomes are defined in terms of the strategic goals of the process. For the purposes of the collaborative modeling logic model, outcomes were described in terms of:

- *Immediate outcomes* – the ways in which a process influences knowledge, awareness, and understanding
- *Intermediate outcomes* – the ways in which a process influences behaviors, plans, and policies
- *End outcomes* – the results of a process in terms of the ultimate goals that it is designed to achieve.

A key characteristic of the logic modeling approach is that it focuses on the relationships between actions (i.e., collaborative modeling activities) and outcomes (e.g., learning, decisions, quality of recommendations) and provides a means for organizing measures in a way that shows how data from action-level measures can be used to draw conclusions regarding the extent to which outcomes were influenced by those actions. It helps account for variables outside the control of the decision process, thereby supporting the development of approaches to isolate the effects of tools and processes that are within the control of process designers and implementers.

Collaborative modeling in the SVP context is embedded in a broader resource planning process, and this planning process is conducted in a broader context defined by the nature of the problem, institutional dynamics, legal constraints, etc. Success of a collaborative modeling process depends not only on the quality of the modeling process but on the way in which the process interacts with the broader planning process. It also depends on the interaction of the planning process, which is influenced by the modeling process, with the broader planning context. To help identify critical relationships among modeling and planning processes and the broader planning context, a context model was developed.

The context model initially served to facilitate discussions about the bounds of the collaborative modeling process and key characteristics of the planning process and context that will determine the influence of modeling processes on broader planning outcomes. The model continued to evolve throughout the study as the logic model and suite of performance measures were refined. Appendix A includes the final version of the context model.

Next, a logic model was developed to identify critical outcomes and to create a detailed theory of relationships among the SVP approach and these outcomes. The logic model reflected the three pillars of SVP, including the steps in traditional water resources planning, structured public participation, and integrated computer modeling. Outcomes were expressed in terms of immediate, intermediate, and end outcomes. The context model served as a reference to define the nature of the relationships, direct or indirect, between the collaborative modeling process and these outcomes and key external factors.

The logic model was used to identify critical elements of the process logic to be tested and variables to be considered to isolate causal relationships between actions and outcomes. The logic modeling facilitated concrete discussions around these abstract topics and was developed iteratively with discussions of the process logic, articulation of performance measurement strategies, and the case study analysis.

The final version of the logic model is included along with the context model in Appendix A. Each text box in the logic model diagram represents a critical element at a specified point in the process logic (i.e., a critical input, activity, output, or outcome). Arrows connecting inputs to activities show how resources invested in a process are used. Connections from activities to outputs show how activities produce outputs and how one activity/output relates sequentially to others. Connections between outputs and outcomes and among outcomes show direction of influence (e.g., how an output influences an outcome or how a more distal outcome is the product of closer in outcomes). The boxes and arrows in the context model represent similar relationships though at a higher level and with less specificity.

An example showing how the logic and context models can be used in conjunction with the suite of performance measures to develop and test theories regarding the benefits of collaborative modeling is presented in the section entitled "Final Suite of Performance Measures."

Performance Measurement Strategy

An overall performance measurement strategy and an initial draft suite of performance measures were developed based on the results of the context and logic modeling activities. These activities identified two critical challenges to be addressed by the suite of measures:

- *Establishing the boundary of collaborative modeling processes* – Discussions around the development of the logic model raised the question of whether it would be possible to isolate and attribute water resource management outcomes to collaborative modeling processes. Outputs from planning processes (e.g., stakeholder convening) provide inputs into collaborative modeling processes and vice versa (e.g., the modeling influences evaluation of alternatives). This challenge was addressed by developing measures to account for variations in the integration of these processes and to gather data to map attribution from collaborative modeling processes to immediate, intermediate, and end outcomes via the planning process.
- *Measuring outcomes further from the point of the collaborative modeling intervention* – Related to the process boundary issue is the challenge of measuring outcomes further from the point of the specific intervention represented by a collaborative modeling process. While close in outcomes, such as the quality of the model, can be directly attributed to the modeling process, outcomes such as the quality of recommendations are a function of both modeling and broader planning processes. More distal outcomes, such as the quality of resource management actions, are influenced by not only the modeling and planning processes but also by the nature of the problem, scientific uncertainty, and

institutional contexts. This challenge was addressed by including in the suite of measures a set of contextual measures corresponding to each set of more distal outcomes.

Based on the logic modeling and considerations of these critical challenges, eight categories of performance measures were identified:

- *Planning setting* – characteristics of the setting within which water resources planning processes are convened, including factors such as the type of resource management issue being addressed, level of conflict at the outset of the process, institutional constraints;
- *Stakeholder participation process* – characteristics of the design and implementation of the overall stakeholder participation process and actual stakeholder participation in planning and modeling processes, including factors such as the degree to which stakeholders participating in the process represented all key interests, opportunities provided for influencing the process design, and conflict resolution processes;
- *Planning process measures* – characteristics of the planning processes employed, including factors such as the nature of convening activities and the quality of the facilitation team;
- *Model setting and modeling* – characteristics of the design and implementation of collaborative modeling processes, including model type, integration of planning and modeling processes, and quality of the modeling team;
- *Model-level outcomes* – the performance of the model itself, including the degree to which the model integrates available information, the handling of stakeholder interests, model transparency, and capability of the model to support the timely evaluation of alternatives;
- *Modeling process-level outcomes* – the performance of the modeling process in terms of its effects on stakeholders' awareness and understanding of others' interests, trust in the planning process, and evolution and clarity of resource management objectives;
- *Planning-level outcomes* – the effect of the collaborative modeling and planning processes on resource management decisions, including the extent to which the process influenced the ultimate outcome, the quality of the resource management decision, and institutional changes that could improve future decisions;
- *Process satisfaction, cost, and duration measures* – level of stakeholder satisfaction with planning and modeling processes and implications of collaborative processes in terms of resources expended and duration.

Review of Existing Approaches

Extensive literature review was conducted in the development of the context and logic models and subsequent development of the suite of performance measures. The U.S. Institute for Environmental Conflict Resolution's (USIECR's) Multi-Agency Evaluation Study (MAES) approach was included in this review. IWR recognized several potential benefits of building on the MAES work, including:

- *Use of demonstrated measures* – USIECR has demonstrated that the survey instruments identified for the MAES initiative are useful for identifying whether collaborative processes result in better agreements and what elements of collaboration are most critical.
- *Possibility of generalizing IWR findings* – The integration of IWR suite performance measures with the USIECR measures presents the possibility that findings regarding the benefits of collaborative modeling could be generalized to the broader universe of environmental settings.
- *Possibility of validating IWR findings* – The integration of IWR suite performance measures with the USIECR measures presents an opportunity for IWR to contribute to the broader discussion of the benefits of collaborative planning and decision-making and vet the theory of SVP and collaborative modeling within a broader community of practitioners.

Based on these potential benefits, the USIECR survey instruments were mapped to the suite of performance measures identified in the collaborative modeling performance measurement strategy. Areas where there was sufficient overlap between the collaborative modeling measures and the USIECR questions were identified. Areas where the USIECR approach would not meet objectives of the performance measures were also identified.

Development of Survey Instrument

Based on the potential benefits of an integrated approach and the significant overlaps between the USIECR tools and the suite of performance measures, it was decided to adopt the USIECR tool in whole[5] and supplement this instrument with additional questions to gather information more specifically aligned with the IWR research question. Supplemental questions created both a narrower and a broader scope than that represented in the USIECR approach, as follows:

- To assess the benefits of collaborative modeling, it was decided that the IWR measures would need to be more specific than the ECR measures to generate enough detail to describe the modeling processes and measure their contributions to planning outcomes.
- To assess the benefits in terms of actual impacts on resource management, the IWR measures would need to be more expansive than the ECR measures to account for a broader range of exogenous factors and include measures of longer-term outcomes.

[5] The specific tool adopted is the Mediation Participant Evaluation questionnaire, OMB No. 3320-0004.

The survey instrument uses different scales for respondents to use to provide information according to their experiences participating in collaborative modeling and planning processes. The most frequently used is a level-of-agreement scale (with options from *strongly agree* to *strongly disagree*). Whereas the USIECR tool uses an 11-point, unlabeled scale, IWR chose to use a 6-point labeled scale to provide respondents with reference points and to disallow the use of neutral responses.

Note that while the approach adopted for measuring the benefits of collaborative modeling was focused on the collection of data using a survey instrument, this approach could be supplemented by other evaluation techniques. The integration of the survey-based approach to addressing the suite of performance measures within a mixed method design is considered in more detail in the section of this document entitled "Implementation Considerations."

Preliminary Case Study Analysis

Selection of Case Studies

The draft survey instrument was tested using a retrospective case study approach. Nine completed or nearly completed collaborative modeling processes were reviewed and compared to identify a set of case studies with a range of different characteristics to test the survey. Candidate processes were compared based on the following criteria:

- Process timeframe;
- Problem type/purpose of collaborative process, including level of problem specificity, level of conflict at the outset;
- Collaboration approach, including the conceptual framework (e.g., SVP) and the collaborative modeling tools employed;
- Size of the effort; and
- Availability and willingness of participants to take part in the case study review.

The case study approach involved collecting responses from a single participant across several cases and from multiple participants for one case. This approach was selected to test the utility of the survey across different types of cases and across multiple perspectives regarding the same case. The following four cases were selected to test the survey instrument:[6]

- Lake Ontario-St. Lawrence River (LOSLR) Study
- Middle Rio Grande Basin Study
- Northern California Drought Preparedness Planning
- Upper Gila/San Francisco River Basin Study

[6] The following five cases were considered but were not included in the case study analysis for this project: Los Angeles Urban Watershed planning; Lower Susquehanna River Basin, Conowingo Pond management planning; Rappahannock River Basin water supply planning; Apalachicola, Chattahoochee, and Flint (ACF) and Alabama, Coosa, and Tallapoosa (ACT) River Systems water allocation planning; Potomac River studies.

Table 1 summarizes the relevant characteristics of the four cases. Seven former participants in these cases agreed to participate in the case study review, four former participants in the Lake Ontario-St. Lawrence River Study and one each associated with the other three case studies. Respondents representing the Middle Rio Grande Basin, Northern California Drought Preparedness planning, and Upper Gila/San Francisco River Basin studies were practitioners in the collaborative modeling processes. Respondents representing the LOSLR case included both practitioners and stakeholder representatives.

Table 1
Collaborative Modeling Processes Used for Case Study Analysis

Process Name	Timeframe	Problem Type/Purpose of Collaborative Process	Collaboration Approach	Process Size
Lake Ontario-St. Lawrence River Study	2000-2008	Design new rules to regulate water levels in Lake Ontario to accommodate changing requirements of stakeholders	– Framework: SVP – Tools: Stella, Excel, process models	$ 20 M
Middle Rio Grande Basin Study	2001-2002	Develop a plan for water supply management for three-county region	– Framework: Sandia National Laboratories' method – Tools: PowerSim	< $1M
Northern California Drought Preparedness Planning	2004-2007	Update previous drought and conservation plans and develop a comprehensive drought preparedness program in El Dorado County, California	– Framework: SVP – Tools: Excel	< $200 K
Upper Gila/San Francisco River Basin Study	2005-present	Develop water resource management decision tools to support articles of 2004 Arizona Water Settlements Act.	– Framework: Sandia National Laboratories' method – Tools: Powersim	about $200K (ongoing)

Case Study Approach

Eleven potential participants in the case study analysis were contacted to explain the purpose of the effort and to ascertain their willingness to participate. Eight potential candidates agreed to participate, seven of whom were able to complete the survey within the designated period.

Participants were provided with background information regarding the project as well as a link to an on-line version of the survey. Participants were asked to answer the survey from the perspective of a stakeholder in the collaborative process. They were also asked to consider the following questions after completing the survey:

- Was the survey easy to use or was it too cumbersome?
- Did the survey ask the right questions?
- Were key questions missing from the survey? Was there a critical point that you wanted to make but could not because the survey did not provide an opportunity?
- Were some questions unnecessary (e.g., the utility of the question was unclear)? Were some formats hard to follow?
- Was the terminology confusing? While some of these questions reflect a context that is broader than water resources planning, could examples be added to help generate better responses?

Following the survey period, survey data were reviewed and survey respondents were interviewed. The interviewer asked each respondent to provide brief background about their experience and relationship to the process for which they completed the survey, background regarding the collaborative process, and feedback regarding the survey design. While interviews were guided by the above questions, respondents were encouraged to elaborate on these questions and provide insights regarding their responses to specific questions.

Survey data were analyzed to assess the effectiveness of the survey instrument for collecting information about the impacts of collaborative modeling. Results were analyzed based on comparisons of data between surveys and within surveys and based on feedback from case study participants, provided in writing and via interviews. Between-survey analysis included review of responses to assess the variability of responses. Also, responses were reviewed to identify patterns in the data that would suggest that respondents interpreted different questions the same, and to assess potential redundancy among questions.

Within-survey data were reviewed to identify response patterns that deviated from the expected patterns suggested by the process theory and to assess whether the rationale for those patterns could be interpreted from responses to other questions. For example, if a respondent indicated satisfaction with the process but did not believe that it would resolve the problem, other responses were analyzed to identify possible explanations for this. Where explanations for data patterns could not be ascertained, respondents were asked to elaborate during the interviews. This feedback was to assess the need for refinements to the survey (e.g., rewording of existing questions or addition of new questions).

Summary of Findings and Implications for Performance Measures

Case study survey data were compiled and are included in Appendix B.[7] Note that these data were collected to test and refine the survey instrument. Respondents were selected based on their ability to provide insights regarding survey design, not to provide a representative sample of stakeholders across a representative set of cases. The case studies were not intended to draw

[7] Note that the survey was refined based on the case study analysis; therefore, some of the survey questions reflected in Appendix B differ from those included in the final survey included in Appendix D.

conclusions about the benefits of collaborative modeling and the data should not be used for this purpose.

From a survey design perspective, the case study data suggested that the original draft survey would be capable of capturing information for collaborative processes that achieve different levels of success. The survey captured different combinations of within-survey responses (e.g., successful outcomes at both the modeling process and planning process levels versus successful outcomes at the modeling process level and less successful outcomes at the planning process level).[8] In most cases, the rationale for the level of success (or lack of success) of a process could be ascertained by reviewing responses to related questions. However, in some cases the logic underlying combinations of responses was not clear and could only be explained with significant conjecture.

A critical objective of the performance measures for assessing the benefits of collaborative modeling is to provide insights to help tailor approaches to specific circumstances and identify and control for key threats to success. Therefore, these findings were significant. The findings suggested that while the draft survey was sensitive enough to capture a range of different outcomes, including different measures of success, in some cases, it did not provide enough information to explain the factors influencing these different outcomes. To address this, interviews were focused on identifying the strengths and weaknesses of the draft survey and formulating strategies for enhancing its explanatory power.

Three major themes emerged from the case study interviews:

- *The survey should provide respondents with the opportunity to express their interpretation of the "bounds of the process."* Participants in the case studies described their involvement in the collaborative modeling processes as ranging from in-depth involvement (e.g., defining variables and structuring relationships) to very little involvement (e.g., primarily consumers of the results of the modeling process). Five of the participants noted their involvement in a range of roles. More than one participant suggested that in order to obtain consistent responses and interpret the data across respondents and processes, it would be necessary to draw a clear distinction between collaborative modeling processes and the overarching planning processes. Several questions were modified or added to the survey to address this issue.[9]
- *The survey should provide questions that capture the variety of approaches to collaborative modeling.* Participants in the case studies noted that the survey implicitly assumed that all collaborative modeling processes are substantially the same. The draft survey did not provide adequate opportunities for describing differences among collaborative modeling processes, including differences in levels of involvement of stakeholders, intended outcomes, and relationships to planning processes. Questions were modified and added to the survey to address this gap.[10]

[8] For example, see responses to Questions 10a-10f, Appendix B.
[9] See, for example, Questions 4a-4d, 4A, 4B, 4C, and 19A in the final survey, Appendix D.
[10] See, for example, Questions 4B, 15, 16b, and 16c in the final survey, Appendix D.

- *The timing of survey relative to the collaborative process could influence the results.* Several participants in the case studies noted that it had been several years since their primary involvement in the collaborative modeling process. The non-practitioner stakeholders who participated in the process suggested that their responses would have been more accurate if they had completed the survey directly after the conclusion of the process. Some of the details requested were no longer available to them and their reactions to the process may have been influenced by events that have occurred since. While this feedback did not affect the design of the survey, it does provide useful information regarding survey implementation, as discussed in the following section.

The case study analysis suggested several other changes to the survey design. Appendix C provides a more complete summary of comments received from case study participants, findings from the analysis of case study data, and changes to the survey design made in response to these comments and findings. The complete survey instrument to be administered to case study participants is included in Appendix D.

Final Suite of Performance Measures

The suite of performance measures was initially developed based on the discussions around the context and logic models. The suite of measures was refined based on consideration of other approaches being used to evaluate collaborative decision processes and feedback from the case study analysis. The final suite of performance measures includes 36 performance measures and 3 "instrument-level" measures that could be useful for interpreting survey data. Table 2 lists and defines the measures.

Table 2
Suite of Performance Measures to Assess the Benefits of Collaborative Modeling

Performance Measure Category and Title	Performance Measure Description
1. Setting, Activity, and Resource Measures	
1a. Planning Setting Measures	
1a1. Problem focus	Identification of resource management issue(s) being addressed by collaborative planning and modeling processes
1a2. Level of certainty and clarity	Characterization of the extent to which the problem is well-defined, in terms of level of certainty and extent to which the separation between facts and values is clear
1a3. Level of conflict	Characterization of level of conflict (e.g., degree of consensus or diversity of opinion) at the outset of the collaborative modeling process
1a4. Institutional context	Characterization of complexity of the broader institutional environment within which water resource planning decisions are being made and implemented
1b. Stakeholder Participation Process Measures	

Performance Measure Category and Title	Performance Measure Description
1b1. Stakeholder participation process design and implementation	Design and implementation of the overall stakeholder participation process, covering stakeholder participation in both planning and modeling processes
1b2. Actual stakeholder participation in planning and modeling processes	Degree of actual stakeholder participation in the planning and modeling processes, including measures of representativeness of stakeholders who actually participated
1c. Planning Process Measures	
1c1. Planning process description	Factual information about planning processes
1c2. Quality of facilitation team	Characterization of quality of the facilitators in the collaborative planning process
1d. Model Setting and Modeling Process Measures	
1d1. Fact finding process design and implementation	Nature and description of fact finding processes
1d2. Model description/platform	Factual information about the modeling tool(s) used in a collaborative modeling process, including model type/platform
1d3. Modeling process description	Factual information about modeling processes including tools and activities employed to identify and convene stakeholders in the development, testing, and use of the model
1d4. Integration of planning and modeling processes	Factual information about the integration of planning and modeling processes
1d5. Quality of model building team	Characterization of quality of the modelers in the collaborative modeling process
2. Collaborative Modeling Outcome Measures	
2a. Model-Level Outcome Measures	
2a1. Integration of stakeholder interests in model	Degree to which model was customized to accommodate stakeholder objectives, binding constraints, and management alternatives, including controls for bias
2a2. Model transparency	Degree of model transparency in construction and operation, including degree to which model users understood correspondence between model inputs and outputs
2a3. Interactive capacity of model	Characterization of model qualities such as flexibility to interactively evaluate alternatives, and usability of interface and model levels
2a4. Confidence in the model	Characterization of the confidence in the model developed using the collaborative modeling process
2b. Modeling Process-Level Outcome Measures	
2b1. Integration of available data in model	Degree to which model incorporated best available data and used methodologies to maximize data utility
2b2. Quality of alternatives evaluation process	Extent to which model provided output and operated in a manner that improved the quality of the process of evaluating alternatives
2b3. Impact on planning-level outcomes	Extent to which problem resolution can be attributed to collaborative modeling process

Performance Measure Category and Title	Performance Measure Description
2c. Planning-Level Outcome Measures	
2c1. Change in knowledge	Degree to which the collaborative modeling process addressed uncertainty and changed individuals' knowledge of the issues to be addressed
2c2. Changes in awareness and understanding	Degree to which the collaborative modeling process changed individuals' awareness of other stakeholder goals, objectives, and constraints
2c3. Change in trust	Extent to which the collaborative modeling process changed the level of trust among participants and in the validity of the model and its ability to fairly differentiate among management alternatives
2c4. Change in stakeholder cooperation	Extent to which participation in the collaborative modeling process influenced cooperation among stakeholders
2c5. Change in capacity to communicate	Extent to which participation in the collaborative modeling process changed the capacity of stakeholders who participated in model building and use to communicate with other stakeholders and key decision-makers
2c6. Evolution and clarity of objectives	Extent to which the modeling process helped to clarify the objectives of stakeholders, distinguish between facts and values, and focus on objectives rather than on default positions, and extent to which objectives were allowed to and did evolve during the modeling process
2c7. Agreement level	Extent of agreement on a recommended plan
2c8. Alternatives-recommendation consistency	Degree to which the recommended plan was influenced by alternatives evaluated using collaborative modeling
2c9. Quality of recommendations	Stakeholders' perceptions regarding the degree to which recommendations addressed and fairly balanced their objectives against others; analog to "agreement" in ECR evaluation
2c10. Action level	Extent to which management actions have been undertaken along a continuum from selection of a plan, commitment to act to degree to which actions have been implemented
2c11. Action-recommendation consistency	Degree to which actions were consistent with the recommendations that resulted from the modeling process
2c12.Quality of Actions	Stakeholders' perceptions regarding the quality of resource management actions and deductions from other measures regarding consistency with recommendations developed through representative process
2c13. Institutional learning and change	Evidence of institutional or organizational change that resulted from participation of decision-makers and key stakeholders in the collaborative modeling and planning process
2c14. Adaptive management capacity	Extent to which collaborative modeling and planning processes created conditions conducive to adaptive management and/or led to the adoption of adaptive management practices
2d. Process satisfaction, cost, and duration measures	

Performance Measure Category and Title	Performance Measure Description
2d1. Satisfaction with process	Participants' satisfaction with the collaborative planning and modeling processes
2d2. Process costs and duration	Impact of collaborative processes on cost and duration
3. Instrument-level measures	
3a. Background	
3a1. Process identity	Identity of process about which respondent is completing the survey
3b. Respondent perspective	
3b1. Institutional perspective	Institutional perspective of survey respondent
3b2. Participation in process	Description of participation of survey respondent in process about which respondent is completing the survey

Appendix E contains additional information, including classification of measures into variable types (i.e., exogenous, endogenous, mixed, or interpretive), survey questions associated with each measure, discussions of how survey data could be interpreted to address the measure, and areas for further development. Figure 1 illustrates the relationships between the logic model, context model, suite of performance measures, and survey tool and provides an example of how these tools can be used in concert to test hypotheses regarding the benefits of collaborative modeling.

Figure 1
Example of Use of Logic and Context Models to Develop Research Hypotheses

This example illustrates how the logic and context models developed herein can be used in conjunction with the suite of performance measures and survey data to test hypotheses regarding the benefits of collaborative modeling.

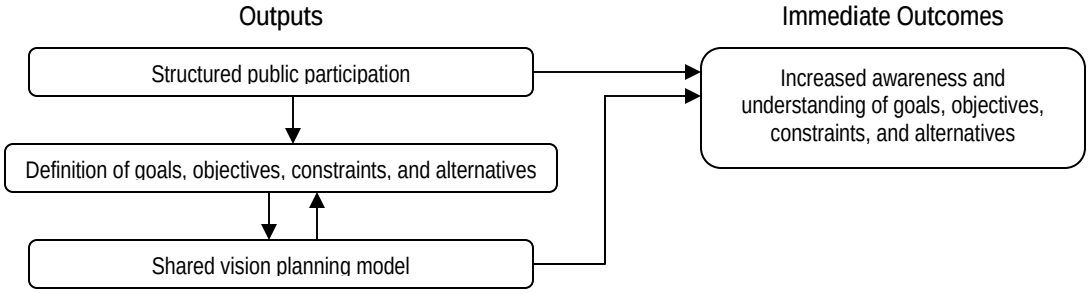
Example hypothesis: Modeling processes that are more collaborative result in increased awareness among stakeholders of other stakeholders' interests.

Identifying independent and dependent variables:

Variable type	Variable definition	Data sources
Independent (exogenous)	Extent of collaboration in modeling process	Survey questions associated with Performance measure 1d3, "Modeling process description"
Dependent (endogenous)	Change in awareness of other stakeholders' interests	Survey questions associated with Performance measure 2c2, "Change in awareness and understanding"

Identifying confounding variables (to be controlled for to isolate causal relationship between independent and dependent variables):

- The logic model (Appendix A, excerpted below) illustrates the logic linking collaborative modeling in an SVP context to change in awareness of other stakeholders' interests. The model suggests that there is also a direct relationship between structured public participation and this outcome.



- The context model (Appendix A) illustrates the theoretical relationship between change in awareness of other stakeholders' interests (defined as a planning-level outcome) and the nature of the modeling process (defined as a modeling process variable). The following excerpt from the context model highlights some variables of interest.

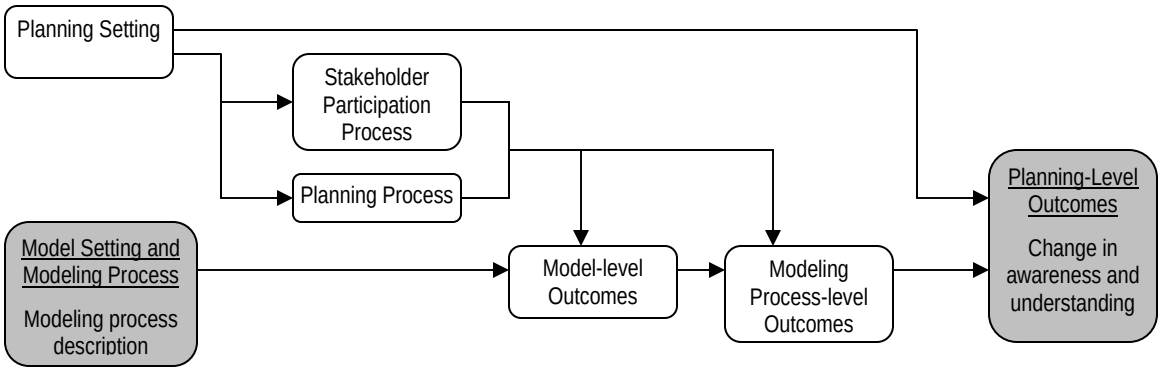


Figure 1
Example of Use of Logic and Context Models to Develop Research Hypotheses
(continued)

Identifying confounding variables (continued)

- The context model posits that:
  - Changes in awareness are influenced directly by planning setting variables that may be outside of the influence of the planning process.
  - Stakeholder participation and planning processes can exert influence on this outcome independent of the modeling process.
  - The influence of the modeling process and the outcome of interest could be measured by examining the causal chain from the modeling process to model-level outcomes to modeling process-level outcomes to the planning-level outcome.
- An examination of the performance measures associated with the relationships suggested by the logic and context models will be useful to identify the potential confounding variables to be considered when evaluating the relationship between level of collaboration in the modeling process and change in awareness. An examination of the survey questions associated with each performance measure will indicate the extent to which the survey instrument will yield data associated with the performance measures of interest.

Implementation Considerations

The previous sections of this document outline a suite of performance measures and document the development of a survey instrument that could be used to gather information to assess these measures. For example, questions regarding the level of trust among participants at the outset of the process (Question 13a) and as a result of the process (Question 13b) represent a tool for collecting information to assess the measure "change in trust" (Measure 2c3). While the suite of measures and the survey instrument provide the basic building blocks for assessing the benefits of collaborative modeling, their utility will depend on the manner in which the survey is administered and the approaches used to analyze and interpret results. The following section outlines some critical choices to consider when implementing the performance measures described herein.

Evaluation Design

The proposed survey instrument incorporates both retrospective pre-post and counterfactual evaluation designs. Pre-post questions ask respondents to think back to the outset of the process and assess conditions such as the level of trust and cooperation among participants and levels of knowledge, awareness, and understanding. Respondents are then asked to assess these same conditions as they existed at the conclusion of the process. Responses provide information from which the impacts of the process, and (when other variables are included) the impacts of process choices, can be inferred. Questions 12 and 13 in the final draft survey instrument represent examples of this approach.

Question 8 in the final draft survey provides the foundation for a counterfactual, "what if," evaluation approach. It asks respondents to make a judgment as to the process that would have been used to resolve the resource management issue if the collaborative process had not been used. Questions 9-11 explicitly ask respondents to compare the collaborative process in which they were involved to this "what if" scenario. Other questions (e.g., 17a) employ a similar approach.

Many of the questions included in the survey do not use either of these methods and, as such, do not provide a basis for quantitatively evaluating the impacts of collaborative processes relative to non-collaborative processes. Nonetheless, the data collected via these questions will be useful for evaluating the effects of different contexts and choices in collaborative process design on process- and planning-level outcomes.

Alternative evaluation designs that could be used to interpret the survey data include quasi-experimental design and mixed methods design. For a quasi-experimental design, collaborative and non-collaborative processes could be compared based on outcomes such as level of trust at the conclusion of the process or the extent to which the recommendations take into account key interests. In the terminology of quasi-experimental design, collaborative process would be considered the experimental group and non-collaborative processes would be treated as a non-equivalent control group. Historically, however, many collaborative processes have been employed in difficult situations that have reached a point of dispute. Therefore, it is likely that the universes of collaborative and non-collaborative planning processes would be dissimilar and special care would be required to address this potential case selection bias when selecting a non-equivalent control group in support of a quasi-experimental design.

A mixed methods design employs a combination of quantitative evaluation based on the results of the survey and qualitative methods to address questions that are raised but not adequately answered using a purely quantitative approach. Qualitative methods, including interviews, case studies, and similar data collection techniques, could be used in concert with quantitative analyses to provide insights that would be useful for process designers and implementers. In complex policy and planning contexts, quantitative methods alone can rarely provide perfect information and often raise questions whose explanation requires more in-depth study.

For example, if stakeholders involved in a process provided different responses to the survey that could not be reconciled in a uniform process theory, interviews could be conducted to better understand the reasons for this. While specific to the case, the results of such a study could lead to more broadly applicable insights regarding process dynamics. In this way, the quantitative tools would help to prioritize areas for more in-depth study, and qualitative methods would help elucidate the issues and inform the refinement and development of quantitative tools.

Survey Timing

The survey instrument as currently written assumes that the survey will be administered after a collaborative process has been concluded. Alternatively, with modifications to the question wording and selection, the survey could be administered prior to a process and/or at an intermediate stage as well. For pre-post questions, this would represent a shift from retrospective pre-post design to a pre-then-post test design. Both of these design approaches suffer from potential threats to validity.[11]

Pre-then-post designs are subject to "response-shift" bias. The theory of response shift bias expresses the possibility that by participating in a process, individuals may apply a different standard of rating than they did prior to participating in a process. The shift results from a better understanding of the concepts and contextual environmental being addressed by the survey. In the context of the collaborative modeling survey, stakeholder participants who have not been involved in a previous collaborative process would be more sensitive to this bias. A careful review of the concepts included in the survey and a participatory situation assessment prior to administering the survey could help control for this type of bias.

Retrospective pretests (which are given at the end and inquire about initial conditions) are subject to "motivational" and "cognitive" biases. In the collaborative modeling context, motivational bias could be introduced by participants tending to exaggerate the impact of a process to justify the effort that they have put into it. Cognitive bias can be introduced when respondents hold an implicit theory of the change expected from the process, and this theory is reflected in their responses. Retrospective pre-test questions and post-test questions could be administered in separate surveys at different times to help control for these types of bias. Also, questions about outcomes that would not be expected to be addressed by a collaborative modeling process could be included in the survey and analyzed to assess and account for respondents' tendency to show improvement.

Participants in the case study analysis indicated that it would be important to administer the survey in conjunction with and/or as soon after the collaborative process as possible, as this will improve the accuracy of responses. Initially, in order to build a dataset sufficient to assess the benefits of collaborative modeling, it may be necessary to gather information about past processes well after they have concluded. Differences in the length of time between the conclusion of a process and administration of the survey should be considered when interpreting results.

[11] See, for example, Taylor et al, 2009. Biases in Retrospective Pretests. American Journal of Evaluation, 30:1, March.

Variable Definitions and Relationships

Performance measures listed in Appendix E are categorized as "endogenous," "exogenous," "mixed" or "interpretive" variables. This categorization is intended to convey information about the structural relationships among the measures that could be useful in formulating methods for analyzing survey data. For the purposes of assessing the benefits of collaborative modeling, these categories have been defined as follows:

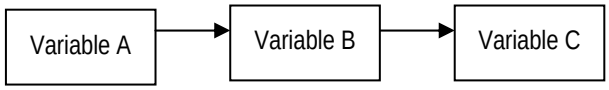
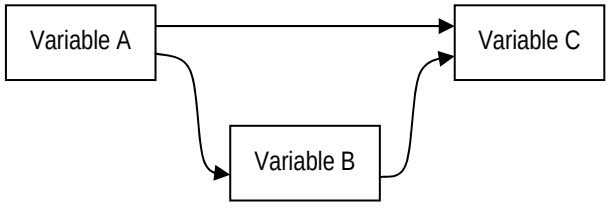
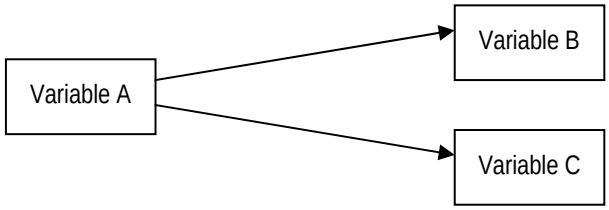
- *Exogenous variables* – independent variables that express conditions that are predetermined (i.e., whose causes are unspecified in the analytical model). Exogenous variables are used to evaluate relationships between these predetermined conditions and outcomes (endogenous variables) whose causes are being evaluated. Within the context of this application, exogenous variables include not only the measures that describe the planning setting (e.g., problem type, level of conflict) but also the characteristics of the process (e.g., planning process measures).
- *Endogenous variables* – dependent variables that express the outcomes whose posited causes (exogenous variables) are explicitly specified in the model. Within the context of this application, endogenous variables include measures that describe model-level, modeling process-level, and planning-level outcomes.
- *Mixed variables* – variables that can be used as both exogenous and endogenous variables depending on the question being analyzed. Within the context of this application, mixed variables could include closer-in outcomes that are both influenced by process variables and influence more distal outcomes. In the former case, the outcome would represent an endogenous variable and in the latter, it would represent an exogenous variable.
- *Interpretive variables* – other variables included in a model to help interpret results. In the context of this application, interpretive variables include measures of level of satisfaction with the process, measures of cost and duration, and measures to help interpret survey data (i.e., "instrument-level measures").

Note that while process characteristics, such as the design and implementation of stakeholder participation, reflect choices by process designers and implementers at the outset and during a collaborative process, they are considered exogenous variables from the standpoint of evaluating the benefits of collaborative modeling. This reflects that fact that the evaluation is not focused on the question of how other factors affected these choices. Rather, the focus is how these choices affected the outcomes of the process (e.g., changes in awareness and understanding).

Note that while process characteristics are treated as exogenous variables in the evaluation of outcomes, they may reflect the influence of other variables, particularly those describing the planning setting. Similarly, outcomes such as change in level of trust may affect higher-level planning outcomes such as the quality of recommendations. In this way, the measure acts as both an exogenous variable (influenced by process characteristics) and an endogenous variable (influencing planning-level outcomes). Another example of this "mixed variable" type is actual stakeholder participation, which is hypothesized as both influenced by process decisions and influencing process outcomes.

These complex variable relationships have implications for methods used to analyze the survey data. Simple analyses of the survey data may yield information about the covariation among variables from which conclusions about the impact of collaborative processes can be inferred. However, more complex methods, such as path analysis, may be necessary to more fully understand the nature of the variables and more clearly evaluate cause-and-effect relationships. Examples of the types of relationships to be considered when evaluating survey data include causal chain (where one variable acts through another to influence a third), direct and indirect effects (where one variable directly influences a second and indirectly influences the second variable through a third) and spurious (where two variables covary but they do so because of a common cause, not because they are causally related) relationships. These three types of relationships are illustrated and their implications for design and interpretation of performance measurement data are discussed in Figure 2.

Figure 2
Types of Complex Variable Relationships

Causal Diagram	Considerations
Simple causal chain 	• Understanding causal chain can help better understand process complexities and inter-relationships. • Evidence of relationship between B & C can lead to more efficient measurement approach (i.e., measure one instead of both variables).
Direct-and-indirect effects 	• Identifying both direct and indirect effects is necessary to interpret strength of relationship between A & C (i.e., direct relationship could be over- or under-estimated). • Indication of direct and indirect relationships demonstrates necessity of measuring all three variables.
Spurious common cause 	• A common cause (A) for variation in B & C could lead to misidentification of a causal relationship between B & C and misinterpretation of implications for process design and implementation. • Common cause should be explored where correlations cannot be explained by original or alternative theories.

Perhaps the greatest threat to misinterpretation of complex variable relationships is the potential for spurious relationships. For example, a spurious relationship could emerge between model-level outcomes and planning-level outcomes in a situation with high initial conflict, complex

institutional contexts, and a strong potential for increased trust and for key stakeholders to influence the outcome without participating in the collaborative process. A simple analysis that does not explicitly control for this possibility may show a correlation between greater levels of trust and lower quality resource management outcomes. Consistency measures (i.e. "alternatives-recommendation consistency" and "action-recommendation consistency") are intended to help shed light on the intersection among the components of the planning process, better interpret variable relationships, and help establish casual links among process decisions and outcomes and between closer in and more distal outcomes.

Finally, the interpretive measures included herein reflect, in part, a difference in focus between the USIECR survey and this current effort and, in part, a recognition that the survey data is subject to the perspectives of survey respondents. Interpretive measures include:

- *Level of satisfaction with the process* – In some contexts measures of level of satisfaction could be interpreted as outcomes. However, because the focus of the evaluation of collaborative modeling is the resource management outcome (rather than the conclusion of the process), these measures are considered "interpretive." They could be used to provide insights into respondent perspective when interpreting variations in outcome measures.
- *Cost and duration measures* – Cost and duration measures as specified herein (e.g., whether the process cost more or less than the alternative) are measures of the process, rather than measures of process outcomes. The effects of cost and duration on the process (e.g., whether the duration of the process had a negative impact on participation) are explicitly addressed through other measures. Cost and duration measures can be used to evaluate trade-offs between collaborative and non-collaborative planning processes.
- *Instrument-level measures* – Instrument-level measures provide information about the identity of the process and the perspectives of survey respondents. The process identity measure will provide analysts with a link to other sources of factual information about the processes (e.g., whether they involved multiple states or countries) to enable the integration of survey and other data. Measures of respondent perspective could be used to help interpreting variations in outcome measures.

Data Sources

The survey has been designed to collect information from both practitioners and participants in collaborative modeling processes, where practitioners are defined as neutral parties responsible for facilitation or model development (see Question 20 of survey). It is expected that there will be systematic differences between practitioner and participant perspectives due to differences in process orientation (i.e., neutral vs. interest-based). Systematic differences could also exist based on training and level of experience in situation assessment.

Three approaches could be used to account for these differences in perspective: 1) administer the survey only to practitioners or only to participants; 2) develop separate surveys, one for

practitioners and one for participants; or 3) explicitly account for role in the process when interpreting results. Because multiple perspectives will provide greater insights into collaborative modeling processes, it is recommended that data be collected from both practitioners and participants and that differences in perspectives be explicitly considered when interpreting the data.

Controlling for Hierarchical Data

Given the complexity of the collaborative processes that are the subject of this study, it will be useful to collect multiple perspectives for each collaborative modeling case. This will create a hierarchical data structure that will need to be addressed in the analysis of the survey data. A multi-level modeling approach could be used to address the hierarchical data.[12] A multi-level modeling approach, such as that used to evaluate USIECR data, would analyze separately the responses associated with each unique collaborative process (e.g., via contingency table analysis) and then evaluate the extent to which differences among cases affect differences within cases.

Such an approach allows for the collection of multiple perspectives regarding specific collaborative processes and highlights in a statistically sound manner the ways in which different contexts and process decisions affected process, resource management, and long-term institutional outcomes.

Conclusions

The suite of performance measures described herein represents a starting point for evaluating the benefits of collaborative modeling relative to water resource management decisions and outcomes. These measures establish a framework for the systematic collection and analysis of data from collaborative modeling processes to develop an empirical basis for evaluating process outcomes. The survey developed in support of these measures represents an instrument for collecting data for quantitative analysis.

The survey tool has been submitted to the White House Office of Management and Budget (OMB) in compliance with the requirements of the Paperwork Reduction Act. IWR is currently awaiting comments and will work with OMB to address comments and obtain approval. Upon approval, the survey will be available for general use

In addition to obtaining OMB approval of the survey instrument, IWR should develop an evaluation plan addressing the implementation considerations identified above. The plan should provide guidance regarding alternatives for administering the survey, including alternatives for survey timing and approaches for ensuring a representative sample of perspectives. Survey

[12] See, for example, Sullivan, Dukes and Messina. 1999. Introduction to Hierarchical Linear Modelling. Statistics in Medicine; 18, 855-888.

administration guidance should also provide information regarding how to submit data to IWR, how the data will be used, and how anonymity will be protected.

The evaluation plan should include an analysis plan that describes how data collected using different survey administration approaches will be analyzed. The evaluation plan should specify how these components (survey administration and data analysis) will mitigate threats to internal and external validity, such as those highlighted in the previous section. The plan should also consider alternatives for collecting qualitative data to enhance the interpretation of survey data using an overall mixed method approach.

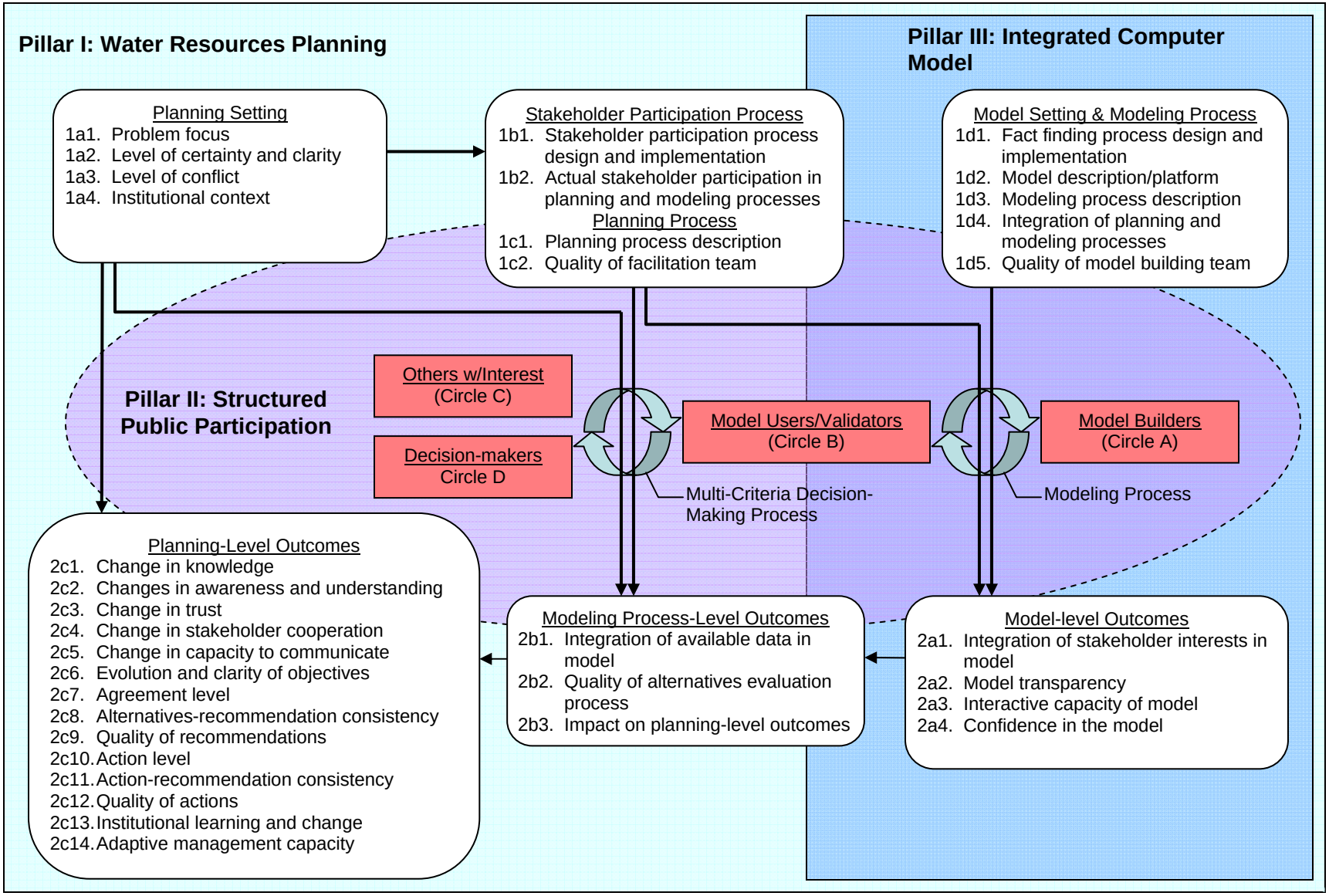
As the evaluation of collaborative modeling processes proceeds, new insights will be gained regarding the most critical process decisions and the distinguishing contextual characteristics to be measured to evaluate collaborative modeling outcomes. In addition, new ideas will emerge regarding how to measure resource management outcomes that are both further from the point of the collaborative modeling intervention and the most important outcomes from the perspective of stakeholders. These ideas will emerge from the insights gained through the evaluation itself as well as discussions with others working to evaluate the outcomes of collaborative decision-making and dispute resolution processes. One promising avenue for further methodological research and development includes the Systematic Evaluation of Environmental and Economic Results (SEEER) initiative.[13] Areas for further possible development that have already been identified as a result of this study are outlined in Appendix E.

Insights and ideas gathered based on the evaluation of the benefits of collaborative modeling may suggest new approaches for collecting data and evaluating the suite of performance measures identified herein. They may also suggest changes and refinements to this initial suite of measures. While shifting measurement approaches and frameworks may involve methodological challenges, these challenges should be seen as necessary hurdles to be overcome to further the understanding of these processes, rather than a rationale for inaction. If the measures are to provide useful feedback, they should be considered a work in progress and should be allowed to evolve to meet the evolving understanding and needs of the designers and implementers of collaborative modeling processes.

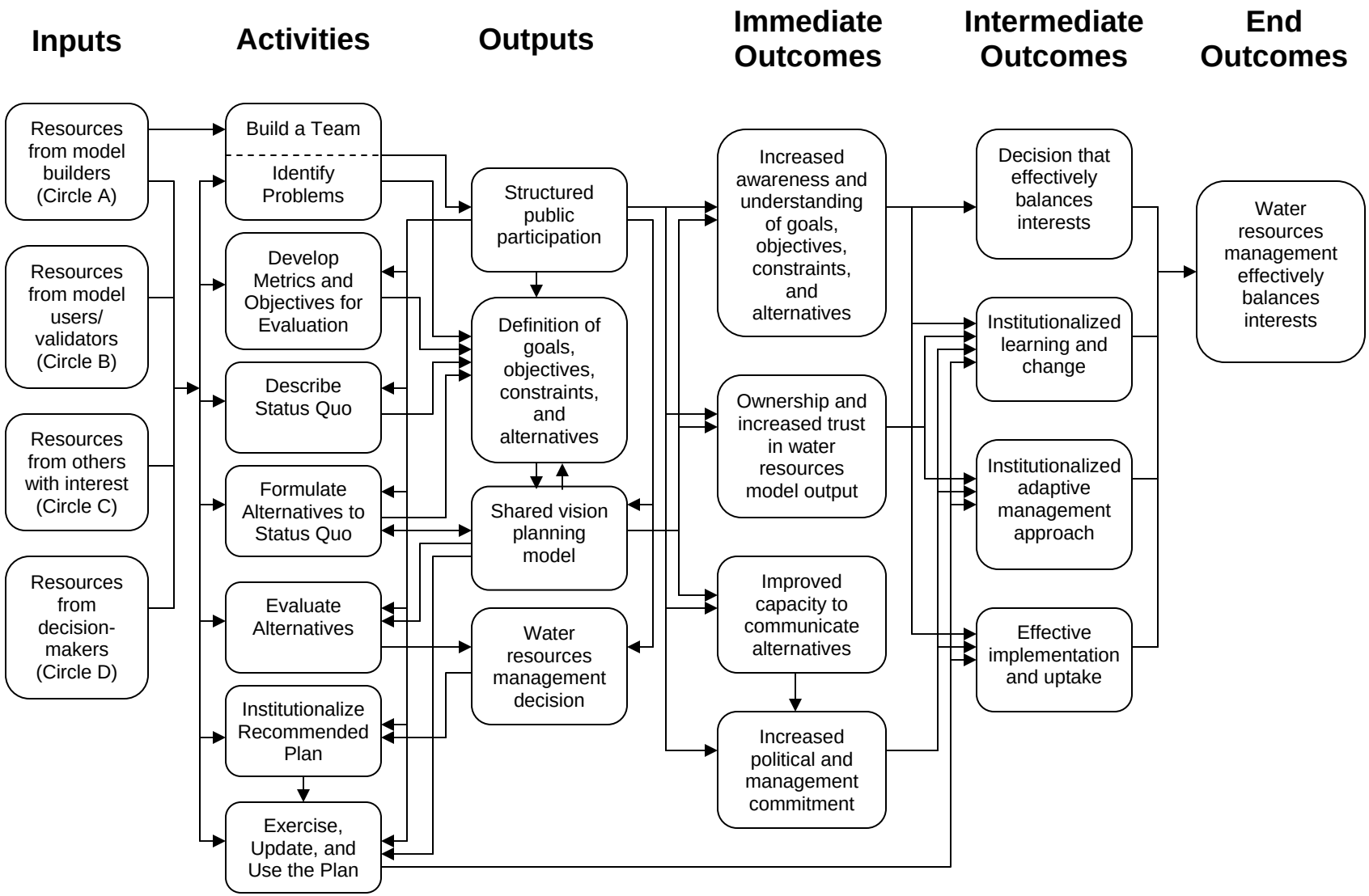
[13] SEEER is a joint project of EPA's Conflict Prevention and Resolution Center and the Department of Interior's Office of Collaborative Action and Dispute Resolution. SEEER uses a constructed counterfactual approach reflecting multiple stakeholder perspectives and expert elicitation to compare the environmental and economic results of environmental conflict resolution to its alternatives. Information is available through EPA's National Center for Environmental Information.

Appendix A: Context and Logic Models

Performance Measures Strategy



Overarching Logic – Shared Vision Planning



Appendix B: Case Study Survey Data

Case Study Responses
Draft Participant Questionnaire
Performance Measures to Assess the Benefits of Collaborative Modeling

Note that these data were collected to test and refine the survey instrument. Respondents were selected based on their ability to provide insights regarding survey design, not to provide a representative sample of stakeholders across a representative set of cases. The case studies were not intended to draw conclusions about the benefits of collaborative modeling and the data should not be used for this purpose.

Total Responses: 7

ID CODE:

Responses not summarized

1. Please describe the name of the collaborative process for which you are completing this survey. CHECK THE MOST APPROPRIATE BOX ONLY

Response	Response Count
Gila Project	1
International Lake Ontario-St. Lawrence River Study	2
IWR collaborative modeling survey	1
Middle Rio Grande	1
Shared Vision Planning (unspecified)	1
No response	1

2. Which category best describes the interest or organization you represented in this process? CHECK ALL THAT APPLY

Response	Response Count
a. Federal Government	2
b. State Government	
c. Local/Regional Government	
d. Tribal Government	
e. Environmental/Conservation	1
f. Recreational	
g. Industrial/Resource Extraction	
h. Business/Commercial	
i. Community or Private Citizen	2
j. Special Advocacy Interests	
k. Other; responses to "please specify:": • Facilitator/researcher • Public agency consulting	2

3. As a representative of your organization, what was your role in communicating with others who were not as directly involved in the process. CHECK ALL THAT APPLY

Response	Response Count
a. I am responsible for conveying information among stakeholders within my organization	4
b. I am responsible for conveying information among stakeholders outside of my organization; responses to "please describe:" • As a member of many environmental groups, I often act as a conduit of information • I would speak to other community based organization, like other neighborhood association, local/state government, etc. • Responsible for information others of the process and its status	3
c. I have authority to make some decisions on behalf of my organization	3
d. I have authority to make all decisions on behalf of my organization	1
e. Other responses to "please describe:" • I had authority to discuss the project with numerous stakeholders within and outside the project • I have opportunities in all of the areas above	2

4. Please indicate what *you believe* are the priority concerns associated with this collaborative process by ranking any of the following categories. Indicate the highest priority as "1" and then number as many more categories as you choose in descending order (1, 2, 3, ...). Please add notes or any additional categories that are not listed.

Response	Response Count				
	1st Priority	2nd Priority	3rd Priority	4th Priority	Total Count
Agriculture			1	2	3
Air Quality			1		1
Archeology or Historic Preservation					
Coastal Zone or Marine Management				2	2
Ecosystem Management	1			3	4
Endangered Species and/or Critical Habitat				5	5
Energy				4	4
Facility (dam) Reoperation					
Forest and Timber Management					
Flood Damage Reduction (Flood Control)		2		1	3
Flow Regime	1		1		2
Land Use and Urban Development		1		4	5
Mining				1	2
Native American, Alaska Native, Native Hawaiian Issues				1	1
Navigation				1	1
Parks and Refuges				1	1
Recreational Use and Access				3	3
Solid or Hazardous Waste				1	1
Transportation				1	1
Vegetation/Riparian Management			1	2	3
Watershed/River Basin Management	1			2	3
Water Demand Management		2	1	1	4
Water Quality		1		1	2
Water Supply	3		1	1	5
Wildlife Management					
Additional Categories; responses to "please describe:" • Flood protection, erosion reduction of private and public lands	1				1
No response	0	1	1	---	---

5. Using the scale above, please identify the different aspects of the process in which you were involved and rate your level of involvement. *(Note that for the purposes of this questionnaire, a distinction is being made between the "planning process," in general, and the "modeling process," where the latter describes the subset of activities focused on development and use of a quantitative model to evaluate alternatives)*

Response	Response Count			
	Not involved	**Involved very little**	**Somewhat involved**	**Very involved**
a. Process design		1	2	4
b. Problem formulation	1		1	5
c. Fact finding	1	3	2	1
d. Discussions/negotiations with other parties regarding alternatives		1	5	1
e. Coordination of other stakeholder input		2	3	2
f. Model development	2	1	3	1
g. Evaluation of alternatives			4	3
h. Development of recommendations	1		2	4
i. Monitoring the implementation of the agreement	3	1	2	1
j. Other ("conflict resolution when appropriate")				1
j. Other (not specified)		1		

6. Please indicate the extent to which agreement was reached. *(To answer this question, think about what it was that the group was charged to come up with at the end of this collaborative process. The term "agreement" applies to the written or unwritten agreement reached by participants in the process, including plans, proposals/recommendations, procedures, collaborative decisions to work together and settlements.)* CHECK ONLY ONE

Response	**Response Count**	**Comments** (see below)
Agreement reached on all key issues	1	(1)
Agreement on most key issues		
Agreement on some key issues	4	
No agreement on any key issues, but progress was made towards addressing the issues or resolving the conflict	2	(2),(3)
No agreement, we ended the process without making much progress		

.Comments:

(1) Amazingly at the end of the process - all 'thumbs up' to indicate agreement and many testimonials
(2) Since the group was not asked to make one recommendation, but three, it is hard to say there was agreement on key issues.
(3) *No comment provided.*

7. Using the scale above, rate the following statement regarding the agreement (as referred to in #3).

Response	Response Count								
	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know	N/A (no agreement)	*No response*
a. The extent to which you feel the agreement reached takes account of all key interests					2	2		1	2
b. The extent to which you feel that the agreement reached takes account of your key interests				3		1		1	2
c. The extent to which the agreement reached will effectively solve the problem/resolve the conflict			1		1	2		1	2

d. The extent to which you are confident the agreement can be implemented.				2		1	1	1	2

8. If you had not participated in this collaborative process, what would have been the most likely process (or mechanism) for the issues to be addressed or resolved? CHECK ONLY ONE

Response	Response Count
a. Unassisted negotiation	
b. Judicial settlement conference	
c. Litigation	1
d. Lobbying or working to achieve legislative action	1
e. Rulemaking	
f. Arbitration	
g. Administrative proceeding (e.g., agency appeals process, contested process hearing, agency order)	1
h. Unilateral decision by single party	1
i. Wait for a better time to take action	
j. Don't know	1
k. Other; responses to "please specify:" • We would have muddled along as best possible with the status quo, taking into account concerns as they were made known and addressable • Could have been a series of 'others' including a, b, c, g, i above	2

9. Please consider how the collaborative process you completed compares with the alternative that you identified in the Question 8, and then check the most appropriate of the following: CHECK ONLY ONE

Response	Response Count
I feel the collaborative process was *less expensive*….and this level of expenditure was appropriate.	1
I feel the collaborative process was *less expensive*…but additional resources were probably needed.	0
I feel the collaborative process *cost more*…. and the extra costs *were worth* the investment.	4
I feel the collaborative process *cost more*…and the extra costs were *not* worth the investment.	0
Don't know	1
No response	1

10. Using the scale above, how do you think the collaborative process you completed would compare with the alternative that you selected in the question 8? (*Although it may be hard to know what would have happened with the alternative you chose in question 8, please give us you thoughts on the following)*

Response	Response Count							
	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know	*No response*
a. The results of the collaborative process *better* served the interests of the participants.						5	1	1
b. The collaborative process made me *more* aware of other stakeholders' interests and objectives.					2	4		1
c. The results of the collaborative process are *less likely* to be challenged.			3	2		1		1
d. The participants are *more likely* to be able to work together in the future on matters related to this case or project.				4	1	1		1
e. The collaborative process we participated in *more effectively* addressed the issues or resolved the conflict.				1	3	2		1
f. The collaborative process we participated in led or will lead to a *more informed* public action / decision.				1	2	3		1

11a. Using the scale above, please rate the extent to which the following conditions were in place (1) when the process began and (2) as a result of the process.

Response	Response Count						
	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know
The participants were able to work together cooperatively before the process began.		2	2	1	1	1	
The participants were able to work together cooperatively as a result of the process.				3	2	2	

11b. Using the scale above, please rate the extent to which the following conditions were in place (1) when the process began and (2) as a result of the process.

Response	Response Count						
	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know
The participants trusted each other before the process began.	1	3	3				
The participants trusted each other as a result of the process.			1	4	1	1	

12. Using the above scale, please rate your level of agreement with the following:

Response	Response Count						
	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know
a. I had the resources (e.g., time, money) needed to participate effectively in the process.	1	1			1	4	
b. The participants, as a group, felt they were appropriately engaged in designing the process.	1	1			4	1	
c. I was involved as needed in selecting the mediator(s)/facilitator(s).	1	1		1	3	1	
d. The participants, as a group, represented all affected concerns.			1	2	2	2	
e. The absence of participants had a negative effect on the collaborative process.	1		3	1	2		
f. The participants had sufficient authority to make commitments on behalf of their organizations.		2	1	2	2		
g. The participants continued to be engaged so long as their involvement was necessary.				2	1	4	
h. The process helped me gain a better understanding of the all of the issues to be addressed.				1	3	3	
i. The process helped me gain a better understanding of the other participants' views and perspectives.			1	1	2	3	
j. The process helped me identify and focus on the key issues that had to be addressed.				2	2	3	
k. The process helped the participants, as a group, effectively engage to work on the key issues.			1	1	2	3	
l. The participants, as a group, sought options or solutions that met the common needs of all participants.		1		1	4	1	

13a. Please identify your level of familiarity and/or involvement in the model development, testing, and/or application:

Response	Response Count
I was involved in at least one aspect of the modeling process.	4
I was not directly involved but am familiar enough with the modeling process to answer questions about it.	2
I was not involved and am not familiar enough with the modeling process to answer questions about it.	1

13b. Using the scale above, please rate your level of agreement with the following based on your participation in the modeling process:

Response	Response Count								
	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know	N/A	*No response*
a. Participants in the modeling process were involved in defining the overall purpose and use of the model.					4	2			1
b. Participants in the modeling process were involved in identifying data sources, relationships, and assumptions to be used in the model.					4	2			1
c. Participants in the modeling process understood how their questions would be addressed by the model.				1	2	3			1
d. Participants in the modeling process were involved in characterizing the status quo and the assumptions used for the status quo.				1	2	3			1
e. Participants in the modeling process were involved in formulating alternatives to the status quo.				1	2	2		1	1
f. Participants in the modeling process were involved in validating/testing the model.					2	3	1		1
g. Participants were encouraged to directly interact with the model via the interface.			1		2	3			1
h. Modeling results were available in a short enough timeframe to meet the needs of the collaborative process.	1		1		3	1			1

14. Using the scale above, please rate your agreement with the following. *(note that this question should be answered by those who were directly involved in the collaborative modeling as well as those who were less involved in the modeling but, nonetheless, experienced its impacts on the overall process)*

Response	Response Count						
	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know
a. The modeling process improved the extent to which relevant information was integrated into the process (relative to what would have been the case in the absence of the model).				2	1	4	
b. The model addressed all key interests.				2	4	1	
c. The model balanced key interests in an unbiased way.			1	1	3	2	
d. The model presented a realistic portrayal of the relative impacts of different resource management alternatives.				1	3	2	1
e. I trust the technical information used in the model.	1		2		2	2	
f. The model was accessible by all participants, regardless of their technical background.	1	1	1	2	1	1	
g. Participants had adequate opportunities to evaluate scenarios of interest to them using the model.	1			2	1	2	1

15. Using the scale above, please rate your level of agreement with the following:

Response	Response Count							
	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know	N/A
a. We worked effectively to identify information needs.				1	4	2		
b. All participants had full access to relevant information they needed in order to participate effectively in this collaborative process.			1	1	4	1		
c. The quality of the information used was good enough for the process.	1		1		4	1		
d. Relevant information was effectively integrated into the process (e.g., a project web site was used to share information, spatial analysis and decision support tools were used).				2	3	2		
e. As a group, participants gained a better understanding of the nature and magnitude of impacts of different resource management alternatives on their interests other than their own.				1	3	3		
f. As a result of my involvement, I was better able to convey relevant information among the stakeholders and/or decision-makers who I represented.				3	1	2		1
g. The agreement(s) reached was (were) improved as a result of information integrated into the process.	1				2	3		1

16. Using the scale above, please rate your agreement with the following:

Response	Response Count							
	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know	N/A
a. The evaluation of alternatives was better informed as a result of the collaborative fact finding process.		1			2	4		
b. The evaluation of alternatives was better informed as a result of the collaborative modeling process.		1			3	2	1	
c. The trade-offs among stakeholder interests associated with different alternatives were more clearly articulated as a result of the collaborative modeling process.		1			5	1		
d. The comparison of alternatives was more credible as a result of the collaborative modeling process.		1			3	2	1	
e. The alternatives evaluated using the collaborative modeling process contributed to the development of the recommended plan.		1			3	2		1
f. Actions taken (or planned) to address the resource management issue are consistent with		1		2	2		1	1

the recommended plan.								

17. If you rated question 16e "strongly disagree", "disagree", and "somewhat disagree", please identify the reason(s) for inconsistency between actions taken (or planned) and the recommended plan.

Response	Response Count
Alternative recommendations that came from sources outside of the collaborative planning process were used (or will be used) as the basis for action	1
New information and/or key interests were identified but the process was not reconvened	
Legal constraints were identified that required a different planning approach and different actions	1
Agreements required by the recommended were too complex	1
Too much time passed between the conclusion of the planning process and action	2

18a. Please identify the mediators, facilitators, and/or model developers involved in the process by entering their initials in the space provided and identifying the choice(s) that best describe their role and/or roles in the process. *(note that for some processes, one person may serve more than one role – if this is the case, select all of the roles that the person served)*

Responses not summarized

18b. Please identify the choice(s) that best describe the role and/or roles in the process of the practitioner identified in Question 18b. (note that for some processes, one person may serve more than one role –if this is the case, select all of the roles that the person served)

Response	Response Count
Facilitator only	3
Mediator only	1
Model developer only	8
Both facilitator and mediator	1
Both facilitator and model developer	3
Both mediator and model developer	1
Facilitator, mediator, and model developer	1
Not sure	1
Total practitioners	19

19. Using the scale above, please rate the following for each of the mediators/facilitators/ model developers identified in Question 17, above.

PLEASE IDENTIFY EACH MEDIATOR/FACILITATOR/MODELER BY PLACING THEIR INITIALS IN THE SPACE PROVIDED, AND THEN RATE EACH STATEMENT FOR EACH MEDIATOR/FACILITATOR. IF A STATEMENT DOES NOT APPLY TO THE ROLE FOR A SPECIFIC PERSON, WRITE "N/A" IN THE SPACE UNDER THEIR INITIALS. PLEASE USE THE MARGINS TO RATE ADDITIONAL MEDIATORS/FACILITATORS IF NEEDED.

Response	Response Count							
	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	N/A	*Total count*
a. On reflection, this was the right mediator/facilitator/modeler to guide the planning and/or modeling process.		1	1	2	5	8	2	19
b. The mediator/facilitator kept us on track and proceeding in a timely manner.		1	1	1	7	4	5	19
c. The modeler was able to explain to participants with varying levels of experience how the modeling process would work		1	1	2	7	5	3	19
d. The mediator/facilitator helped us manage technical discussions efficiently.		1		1	8	4	5	19
e. The mediator/facilitator dealt with all the participants in a fair and unbiased manner.		1			3	10	5	19
f. When things got tense, the mediator/facilitator was able to help us find ways to move forward constructively.		1		2	3	8	5	19
g. The mediator/facilitator made sure that the views and perspectives of all participants were considered in the process.		1	2		3	8	5	19
h. The modeler made sure that all participants had adequate opportunity to participate in decisions about model structure and data inputs		1	4	1	4	4	5	19
i. The mediator/facilitator made sure that no one dominated the process or other participants.		2	2	1	5	4	5	19
j. The modeler was able to explain in an intuitive way how the model input was reflected the model output (e.g., how different input assumptions affected the output)		1	2	1	8	4	3	19
k. The mediator/facilitator helped the participants test the practicality of the options under discussion.		1		2	3	5	8	19
l. The mediator/facilitator was helpful in documenting our agreement.		1			7	3	8	19
m. The group could not have progressed as far without the help of the mediator/facilitator/modelers.		1	1	1	5	8	3	19

20. Using the scale above, please rate the following statement for processes that involved a modeler/modeling team who worked with a separate facilitator/mediator:

Response	Response Count						
	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	N/A
a. The modeler/modeling team and the facilitator/mediator worked effectively together.				1	2	3	1

21. Think back to the start of the process and please rate the following using the scale above:

Response	Response Count						
	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know
a. At the start of the process, I was willing to work cooperatively with other participants in this process.				1	2	4	

22. Using the scale above, please rate your agreement with the following statements:

Response	Response Count						
	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know
a. I would recommend this type of process to colleagues of yours in a similar situation without hesitation.				1	3	3	
b. We could not have progressed as far using any other process of which I am aware.	1				3	3	
c. The process would not have achieved as much without the use of collaborative modeling.	1				3	3	

23. At this point in time, in very general terms what did this collaborative process accomplish? CHECK ALL THAT APPLY

Response	Response Count
a. A potentially costly or divisive dispute was *likely* avoided.	2
b. An impasse (stalemate) was broken	2
c. A crisis was averted.	2
d. Conflict didn't escalate.	4
e. Costly or protracted litigation was avoided.	
f. Relationships among parties in this process were improved.	4
g. The process resulted in timely decisions and outcomes	4
h. Nothing was accomplished.	1
i. The process made the issues or dispute worse.	1

24. What is your top suggestion on how this collaborative process could have been improved? PLEASE WRITE "NONE" IF YOU FEEL THIS PROCESS COULD NOT HAVE BEEN IMPROVED

- The time needed for the modelers to do their work was shortened likely due to other work they had to do. The professionals involved needed to be given full time access to their work.
- More time for review after data received
- Although the process was transparent and collaboration was successful, a few individuals at the end demonstrated hidden agendas which undermined the final outcome. Honest collaboration should be stressed at the very beginning and throughout the process.
- More money
- Increased representation from other counties and mining company
- Earlier and more detailed inclusion of legal considerations, earlier and better integrated independent reviews
- Training of agency staff who would have to use the model for decision making in the future should have included some back up staff. The lead person on staff left and the agency had an initial problem.

25. From your perspective, what will be the effect (e.g., impacts or benefits) of the agreement reached or progress made? PLEASE WRITE "NONE" IF NOT APPLICABLE, OTHERWISE PLEASE IDENTIFY EFFECTS IN THE CATEGORIES LISTED BELOW AND/OR ADD YOUR OWN CATEGORIES AS APPROPRIATE

Response Areas	Responses
Natural resources and environmental conditions	• Greater appreciation by folks who saw protection of natural resources as 'impediment' • Improved • Improved compared to the previous Plan • Increased focus on enhanced environmental effects of flow changes • Preserved • None (2 responses)
Historic and cultural resources	• Appreciation of the historic resources in the project area previously not well understood • Lost • None (5 responses)
Community and social conditions	• Improved • Increased understanding of concerns and impacts in other areas of the system • Key agreement between agricultural and urban interests • None (4 responses)
Economic conditions	• Greater appreciation of impacts of various alternatives • Improved • Improved though not likely to the degree that some would have hoped for • Potential for increased overall economic benefits • None (3 responses)
Recreational uses	• Improved • Limited enhancement for recreational uses • Linkage of recreational opportunities with water operations and management alternatives • More opportunity • Will vary depending upon the part of the system and the weather conditions • None (2 responses)
Other, please specify	• Better understanding of how the water levels' control works by more people around the Basin & down the River • Coordination among neighboring utilities and planning entities • Greater understanding and awareness of concerns and impacts across a variety of interests • Tool to be used in a separate decision process

Appendix C: Summary of Case Study Analysis and Refinements to Survey Instrument

Summary of Case Study Analysis and Corresponding Refinements to Survey

Question	Case Study Reviewer Comments	Observations from Survey Data	Revisions Made to Survey Design
Intro/ Support Material	• I-1: Defining the bounds of the process will likely be useful for comparing across surveys and being consistent within the survey; need to insert question about whether answering questions just the modeling process or about the overall planning process; the definition of process bounds will lead to potentially different end-points – e.g., creating vs. receiving recommendations	---	• Include expanded discussion describing bounds of modeling and planning processes; identify assumption that survey will be used in context of planning processes and that term "agreement" in this context means a recommended plan; add questions to provide descriptive information about processes; redesign Q5 to use same terminology and help capture more precise data on bounds of involvement; add question to allow the respondent to define what "process" they are answering questions about; adjust "NA" responses elsewhere to allow participants in modeling process only to identify cases where "NA" means "not aware of planning outcome" or "planning process has yet to be completed" (response to comment I-1)
2	None	• 2-1: Limited organizational representation, but good spread relative to limited test sample and other constraints on test (e.g., willingness to voluntarily participate); implications for interpretation of test results	• Observation 2-1: source of uncertainty in survey test/design (no change)
3	• 3-1: How does decision-making relate to role of communication?	• 3-2: Good cross-section of roles and responsibilities relative to structured public participation	• Move Q3 to 5th question; respondents first describe priorities (context) and their overall role, then role relative to communication (response to comment 3-1) • Appears to adequately capture range of roles; limited organizational representation is source of uncertainty relative to this conclusion (response to observation 3-2)
4	• 4-1: List extends beyond bottom of page making hard to know whether you have already checked a particular priority. Also, I didn't have to check all the priorities nor did the ones I check have to be in order • 4-2: Requires prioritization – but I had a group of commensurate priorities (not all on the list), and the balance among them was in fact the point of the process	• 4-7: Priorities appear to capture range of issues in water resources planning/ management	• Consider alternative to 1-10 ranking – e.g., highest priority, priority, relatively low priority – allowing respondents to group priorities of equal importance (response to comments 4-1 and 4-2) • No change; propose to ECR the addition of "water demand management" to future surveys (response to observation 4-7) • No changes per comments 4-3, 4-5, and 4-6: o "Ecosystem management", "endangered species and/or critical habitat", "wildlife management", "parks and refuges",

Question	Case Study Reviewer Comments	Observations from Survey Data	Revisions Made to Survey Design
	• 4-3: Difference between "ecosystem management" and "endangered species and/or critical habitat" vs "wildlife management?" • 4-4: "Flow regime" – means, not an objective • 4-5: "Parks and refuges" vs "recreational use and access"? • 4-6: "Coastal zone management" vs "vegetation/riparian management"?		"recreational areas", and "coastal zone management" are ECR categories o Respondents distinguished between "coastal zone management" and "vegetation/riparian management"
5	• 5-1: Need to define "what process?" in order to make comparisons among survey-takers. • 5-2: I think model development needs to be more clearly defined - do you mean identifying variables; creating causal loop diagrams; actually writing formula??? On our teams we include all of these as part of the "model" - but only the modelers actually write formula - everyone else participates in the other steps • 5-3: Need an N/A category here – "implementation of agreement" is not always relevant- the project goal may not include designing a specific agreement or making recommendations. • 5-4: Survey presumes process is complete (e.g. – question 5i – monitoring implementation of the agreement.) (consider "not yet?") • 5-5: Needs to be a question on context – how did the modeling process relate to planning, what were the intended outcomes; see Cockerill article on range of objectives • 5-6: "Discussion/negotiation regarding alternatives" (development of alternatives?") vs "evaluation of alternatives"?	• 5-6: Good mix of areas of involvement across project life cycle	• Clarify categories to identify situations where respondent was only involved in modeling process (response to comments 5-1) • Ask for comment in Q13a to give respondents opportunity to define role in "model development" (response to comment 5-2 and 13a-1) • Revise intro/supporting materials to clarify that survey uses the term "agreement" to refer to the outcomes of the overall planning process with the presumption that collaborative modeling is a component of overall process/not stand alone; add questions describing processes and interactions (response to comments I-1, 5-3, 5-4, and 5-5)

Question	Case Study Reviewer Comments	Observations from Survey Data	Revisions Made to Survey Design
6	• 6-1: Will you only allow cases that have been completed? If not you might want to add option for decisions that are in process • 6-2: Is "agreement" here the same as in question 5? • 6-3: What "process" is referred to in this question? • 6-4: Apparent presumption that progress is possible without agreement, but not the corollary (agreement but not progress) • Some pause re: expectations regarding outcomes – if process is not seen as a win-win but has support, strong or begrudging, is it a failure?	• 6-6: Two respondents selected "no agreement but progress made;" when cross-referenced to other questions, this resulted in "N/A" responses for questions 7, 19k, and 19l. Questions 14-17 cover the missing information relative to the modeling process.	• Add two new options: "I was involved in the modeling process only and am not sure of the agreement status"; and "The process is ongoing, and an agreement has yet to be reached." (response to comments I-1 and 6-1) • Describe in supporting materials terms used to bound different processes; clarify categories in Q5 (response to comments 6-2 and 6-3) • Add "your key interests" question to Q14 (response to observation 6-6) • Add questions to Q16 about: whether modeling addressed key "problems" being addressed by process; and whether model focused on implementable options (response to observation 6-6) • No change per comment 6-4: Q7c provides opportunity to identify situations where agreement was reached but progress was not made toward resolution. • No change per comment 6-5: allowed for in some issues and no agreement/but progress – whether these responses are interpreted as "failure" is a matter of how the results of the survey are used/not survey design
7	• 7-1: In selecting N/A for these are you assuming the project failed OR that this was not part of the project design? How will you tell the difference? • 7-2: Had to choose "N/A" because the process did not fit any of the choices; however, it would be inaccurate to interpret this as the process "failed" • 7-3: NA = "no agreement?" • 7-4: "Strongly disagree" vs "not at all", somewhat, etc. (these are not statements with which to disagree)	• 7-5: Feedback relative to agreement outcome varies, which suggests that the survey questions will capture both successful and unsuccessful outcomes; upon review of "somewhat disagree" response, indicators of reason include pre-existing lack of cooperation and trust (Q11) and lack of participation of key parties (Q12e)	• Add logic to Q6 to skip this question if not involved in planning process, no agreement yet, or process concluded but no agreement reached (response to comments I-1, 7-1, 7-2, and 7-3) • Revise rating scale (response to comment 7-4) • Require a comment to explain answers that suggest that the agreement will not solve the problem – i.e., "not at all", "very little extent" or "little extent" – do not have a separate set of choices here, many of which would be repetitive with following questions; rather use this open-ended comment field to help explain later responses (response to observation 7-5)
8	None	• 8-1: Responses suggest two additional categories: "status quo maintained" and "a combination of the above" (with requirement for commentary for the latter)	• Add choice, "maintain the status quo with no plans for future action" (to distinguish from "wait for better time…"); add choice; a combination of the above with requirement to comment (likely better response than if change to "choose all that apply") (response to observation 8-1)

Question	Case Study Reviewer Comments	Observations from Survey Data	Revisions Made to Survey Design
9	• 9-1: Juxtaposition of cost and worth – probably cost more, probably had little alternative, outcome still pending (so, worth it?) Could have answered cost question if separated.	• 9-3: General clustering around "cost more… but worth the investment"; remainder of questions get at the process outcomes, so should be able to interpret these responses	• No change per comment 9-1: "don't know" covers the scenario identified in comment; de-coupling cost and worth would not be useful
10	• 10-1: You might want to add option for the participant to add a response not on the list. • 10-2: Difference between "addressed the issues" and "resolved the conflict"? (the "or" made the question answerable.	• 10-3: Relatively high response frequency for "somewhat disagree" for "less likely to be challenged" question; this could be an important area for exploration. Upon review: some indication of modeling process/modeler quality issues; all respondents answered "conflict didn't escalate" in Q23 as outcome, suggesting that issues remain; one respondent answered Q17 "too much time…"	• Require a comment to explain answers to Q10c that suggest that the results are not less likely to be challenged – i.e., answers on the scale from "strongly disagree" to "somewhat disagree" (response to observation 10-3) • No change per comment 10-1: comment did not include suggestions for additional questions; not sure how open-ended option would help • No change per comment 10-2: comment does not suggest that there is a problem with the question
11a&b	None	• 11-1: Logical trend in pre-post response, suggesting that question/rating approach is understandable	None
12	• 12-1: Question raised thoughts of changing leadership over time, and of timeframes generally. • 12-2: No questions about the appropriateness of scope of participation and participants' level of involvement • 12-3: Q12c - not every process has a mediator/facilitator – need a "n/a" (not applicable).	• 12-4: Good variation in ratings across the questions; suggests that series will provide insight	• Add three statements to be rated: "Changes in leadership during the process had a negative effect on the collaborative process", "The overall duration of the process had a negative effect on the collaborative process", "Participants were involved in appropriate roles in the process". (response to comments 12-1 and 12-2) • No change per comment 12-2: online survey inadvertently eliminated "NA" choice.
13a	• 13a-1: Model definition again (see Q 5); maybe ask people what the modeling process included • 13a-2: Not clear on the distinction between the 2nd and 3rd options - "directly" not	• 13a-3: Good cross-section of involvement in modeling relative to objectives of this test	• Ask for comment to give respondents opportunity to define role in "model development" – having picklist would be too redundant with Q5; this open-ended question will provide cross-check (response to comments 5-1 and 13a-1) • Add parenthetical examples to help respondents identify

Question	Case Study Reviewer Comments	Observations from Survey Data	Revisions Made to Survey Design
	distinct enough		whether they were "involved" or not (response to comments 13a-2)
13b	• 13b-1: What do you mean by status quo? • 13b-2: I think you need a question asking whether the participant was involved in defining and or structuring the causal relations in the model.	• 13b-3: Responses to different sets of questions (e.g., a&b, c-g) appear to be identical or very similar; assess whether level of precision in questions is too high relative to participants' experiences and some questions can be combined	• Explain "status quo" in statement 13b,d; add "to be tested" after "status quo" in 13b,e (response to comment 13b-1) • Add statement "Participants in the modeling process were involved in defining and/or structuring the causal relations in the model"; modify statement 13a,b (response to comment 13b-2) • No change per observation 13b-3: contents of statements are distinct
14	None	• 14-1: Good variation in ratings across the questions; suggests that series will provide insight	• Add "your key interests" question, parallel to Q7b (response to observation 6-6, above)
15	• 15-1: We should probably have a question that asks whether there was key information missing which raised important doubt concerning some portion of the model. • 15-2: na = not applicable?	• 15-3: Good variation in ratings across the questions; suggests that series will provide insight	• Add statement "Key information was missing which raised important doubt regarding some aspect of the model" (response to comment 15-1) • Clarify that N/A only applies to statements 15f and 15g (response to comment 15-2)
16	None	None	• Add two statements to be rated: "The modeling process helped to address the problem/resolve the conflict" and "the modeling process took into account implementation factors and helped the process focus on implementable options" (response to observation 6-6, above)
17	• 17-1: Stakeholders changed their mind at the end – riparian property owners were surprised with the conclusion that would cause flooding once in a while – changed their minds able to go back and change model. • 17-2: One process created a plan and parts were implemented – those implementing plan left out Federal and state authorities – wanted to maintain grassroots – other competing plans • 17-3: Another process, environmental groups did an end-around – did not feel that they were adequately included in the	• 17-5: Q16e asks about the modeling process and the choices under Q17 refer to the planning process.	• Modify choices in Q17 to distinguish between recommendations that came from parties that did not participate in the planning process vs. those that did (response to comments 17-1 thru 17-3). • Add new question with choices focused on modeling-planning consistency (response to comment 17-4 and observation 17-5)

Question	Case Study Reviewer Comments	Observations from Survey Data	Revisions Made to Survey Design
	planning project, though the modeling process achieved good outcomes • 17-4: Loss of control over the tool once it's created can be a source of situation where successful modeling process but unsuccessful planning process		
18a	• 18a-1: Should define difference between mediator and facilitator • 18a-2: Had some pause regarding the meaning of "practitioners" • 18a-3: "Practitioners" not defined to include topical experts?	None	• Add definitions of three categories of practitioners (response to comments 18a-1 and 18a-2) • Add statement in 18c addressing question of whether practitioners brought in topical experts when need to move the process forward (response to comment 18a-2)
18b	None	• 18b-1: Good cross-section of practitioner roles	None
19	• 19-1: Need a prefacing question to get to the category of "facilitator" – then go just to the facilitator questions; good to explore both roles; good to explore when combined roles work (e.g., works with expert groups, less so with public) • 19-2: Modeler/facilitator/mediator reviews are a bit awkward....not clear how you will know what the project's defined roles were for these various people...are you assuming that an N/A response means that this was not part of their role? • 19-3: Again, confusion over na (not applicable – but it is to a modeler for a modeling question – vs don't know (how I used it here) • 19-4: I think you need a separate set of questions for each type of support person (you can duplicate some questions across the different types). It is a little confusing as it stands now • 19-5: Limited questions about modelers. Does not include questions about being able to work effectively to display model output in format most useful to participants.	• 19-6: Apparent inconsistencies in responses (e.g., answered "modeler" questions for "facilitator only" practitioners); suggests that questions should be separated for different practitioner types • 19-7: "N/A" response difficult to interpret – could apply to both whether it was the practitioners role and whether there was an agreement; separating questions could address this ambiguity	• Clarify use of "not applicable" in answering this question; suggestions that questions be split into different categories of practitioner would be too cumbersome for practitioners that served more than one role (response to comments 19-1 thru 19-4 and observations 19-6 and 19-7) • Add statement about modeler ability to create appropriate interface; other modeler questions would be redundant (response to comment 19-5) • Add statement addressing question of whether practitioners brought in topical experts when need to move the process forward (response to comment 18a-2)

Question	Case Study Reviewer Comments	Observations from Survey Data	Revisions Made to Survey Design
20	• 20-1: It would be good to explore when combined roles work – e.g., works with expert groups, less so with public • 20-2: Many times, SVP is a good option, but modelers' perceptions that the modeling process is "untouchable" can be an obstacle; facilitators are more "touchy-feely"; these two roles need to be bridged for SVP to work. There needs to be up-front collaboration between the two functions with respect to roles and responsibilities. Some modelers prefer to work with a facilitator rather than try to play both roles. The questionnaire did not get at these issues.	• 20-3: Good variation of responses given small sample	• Add statements to help explain the reasons why the team did or did not work well (response to comments 20-1 and 20-2)
21	None	• 21-2: Clustering of responses suggests limited representation of attitudes among survey testers; implications for interpretation of test results	None
22	• 22-1: Statement 22a, awkward phrasing	• 22-2: Consistency of responses across all questions suggests that differences among questions are not insightful • 22-3: One respondent chose "strongly disagree", which suggests that survey can capture critical viewpoints	• Revise wording in statement 22a (response to comment 22-1)
23	• 23-1: statement 23g is vague - not sure what this will tell you. Need other options here. The project I "reviewed" was most successful and highlighting data gaps, system complexity, others: academic applications (learning how to communicate in interdisciplinary setting; putting qualitative data in a quantitative model); helping see similarities among different stakeholders	• 23-2: Range of responses suggests that this would be a useful area for open-ended comments	• Add another statement regarding other immediate and/or intermediate outcomes, and other longer-term outcomes, such as cultural change and adaptive management (response to comment 23-1) • Add option for open-ended comments (response to observation 23-2)

Question	Case Study Reviewer Comments	Observations from Survey Data	Revisions Made to Survey Design
24	None	• 24-1: Good range of process feedback	None
25	• 25-1: In “each” category below.	• 25-2: In one area, respondent noted that resource was worse off; highlights the fact that the question is leading (it asks about “progress”); also highlights the ambiguity of the “none” response, which could mean either “no progress” (an outcome) or “not applicable” (descriptive information)	• Revise directions to say “in each category addressed…” (response to comment 25-1) • Reword to eliminate leading question and more clearly allow for negative consequences (response to observation 25-2) • Revise instructions to clarify difference between “no progress” and “not applicable” (response to observation 25-2)
Additional Questions			
A1	• A1-1: One thing missing is for the participant to describe how the collaboration was structured in terms of frequency of meetings, length of a meeting, duration of the collaboration, number in the "team", face-to-face verse electronic/phone meetings • A1-2: Thoughts occurring but not addressed: design of process • A1-3: There seems to be an assumption that there is a consistent format for a collaborative modeling process - and in my experience the approach can take several different forms.	---	• Add questions to capture descriptive information about: 1) the planning process; 2) the modeling process; and 3) the interaction between the planning and modeling processes. (response to comments I-1, 5-1, 5-3, 5-4, 5-5, A1-1, A1-2 and A1-3).
A2	• A2-1: Budget issues were addressed in question 9, but not the timeline impacts • A2-2: Might also want to gather perspectives on the effectiveness of the amount of time they spent vs. results of the collaboration • A2-3: Thoughts occurring but not addressed: timeframes	---	• Add question about timeliness of the process, parallel to question 9

Appendix D: Final Survey Instrument

Participant Questionnaire to Assess the Benefits of Collaborative Modeling

IWR is interested in formally measuring whether collaborative modeling is a useful tool for water resource planning and, if so, under what circumstances. The following questionnaire is intended to collect information that will help IWR answer these questions.

This questionnaire expands upon the questionnaire developed by the U.S. Institute for Environmental Conflict Resolution (USIECR) which evaluates collaborative decision-making processes in general. The additional questions included herein evaluate the extent to which outcomes from collaborative processes were influenced by collaborative modeling. These questions focus on water resources planning but the questions about collaborative modeling could have broader relevance in other applications.

IWR is interested in evaluating not only the immediate outcomes of collaborative modeling processes (e.g., improved integration of available information) but also how those outcomes affected the outcome of the overall planning process. Adopting the terminology of the USIECR questionnaire, the term "agreement" as it is used herein refers to the outcome of the overall planning process – a recommended plan. IWR is interested in the perspectives of those who were involved in the collaborative development of a model as well as those who used the results of such a model, regardless of their role in model development. If you were involved only in the collaborative modeling and are uncertain about the overall planning outcome or if you were a user of a collaborative model but are uncertain of how the modeling process was convened, opportunities are provided for you to explain your role and opt out of certain questions.

The results of the survey will be reported back to you, but may also be used for reports, peer-reviewed publications, and professional presentations. In all of these cases, anonymity will be maintained. If you have concerns about the release of this information, please contact: _____

ID CODE: _____

The purpose of the ID Code is to keep anonymity while linking this to future surveys.

To form your ID Code, take the last two letters of your mother's maiden name (Ex: Jones = ES), and then add together your birth month and day (Ex: March 20 = 3 + 20 = 23).
Example ID Code = ES23

1. **Please identify the name of the collaborative process for which you are completing this survey.**

   _____

2. Which category best describes the interest or organization you represented in this process?

CHECK THE MOST APPROPRIATE ANSWER ONLY

☐ a. Federal Government
☐ b. State Government
☐ c. Local/Regional Government
☐ d. Tribal Government
☐ e. Environmental/Conservation
☐ f. Recreational
☐ g. Industrial/Resource Extraction
☐ h. Business/Commercial
☐ i. Community or Private Citizen (e.g., neighborhood association, local resident)
☐ j. Special Advocacy Interests (PLEASE DESCRIBE): _____
☐ k. Other (PLEASE SPECIFY): _____

3. Please identify the concerns that were considered during the collaborative process, and use the scale below to rank these concerns based on what *you believe* were the highest priorities. More than one concern may be identified in the same category (e.g., "highest priority"). Please identify and rate any additional categories that are not listed.

	Highest priority	Relatively high priority	Relatively low priority	Not a consideration
Agriculture	☐	☐	☐	☐
Air Quality	☐	☐	☐	☐
Archeology or Historic Preservation	☐	☐	☐	☐
Coastal Zone or Marine Management	☐	☐	☐	☐
Ecosystem Management	☐	☐	☐	☐
Endangered Species and/or Critical Habitat	☐	☐	☐	☐
Energy	☐	☐	☐	☐
Facility (dam) Reoperation	☐	☐	☐	☐
Forest and Timber Management	☐	☐	☐	☐
Flood Damage Reduction (Flood Control)	☐	☐	☐	☐
Stream Flow Regime	☐	☐	☐	☐
Land Use and Urban Development	☐	☐	☐	☐
Mining	☐	☐	☐	☐
Native American, Alaska Native, Native Hawaiian Issues	☐	☐	☐	☐
Navigation	☐	☐	☐	☐
Parks and Refuges	☐	☐	☐	☐
Recreational Use and Access	☐	☐	☐	☐
Solid or Hazardous Waste	☐	☐	☐	☐
Transportation	☐	☐	☐	☐
Vegetation/Riparian Management	☐	☐	☐	☐
Watershed/River Basin Management	☐	☐	☐	☐
Water Demand Management	☐	☐	☐	☐
Water Quality	☐	☐	☐	☐
Water Supply	☐	☐	☐	☐
Wildlife Management	☐	☐	☐	☐
Other Category #1 (PLEASE DESCRIBE) _____	☐	☐	☐	☐
Other Category #2 (PLEASE DESCRIBE) _____	☐	☐	☐	☐
Other Category #3 (PLEASE DESCRIBE) _____	☐	☐	☐	☐

4. Using the scale below, please identify the different aspects of the process in which you were involved and rate your level of involvement. *(Note that for the purposes of this questionnaire, a distinction is being made between the "planning process," and the "modeling process," where the latter describes the subset of activities focused on development and use of a quantitative model to evaluate alternatives. Note that the term "model development" as used herein refers to the process of identifying important variables, relationships among variables, and output requirements; it does not refer to the task of actually programming the model)*

	Not involved	Involved very little	Somewhat involved	Very involved	Not Applicable
a. Planning process (overall)	☐	☐	☐*	☐*	---
b. Modeling process (overall)	☐	☐	☐**	☐**	---
c. Planning process design	☐	☐	☐	☐	---
d. Modeling process design	☐	☐	☐	☐	---
e. Problem formulation	☐	☐	☐	☐	---
f. Fact finding	☐	☐	☐	☐	---
g. Discussions/negotiations with other parties regarding alternatives	☐	☐	☐	☐	---
h. Coordination of other stakeholder input	☐	☐	☐	☐	---
i. Model development	☐	☐	☐	☐	---
j. Evaluation of alternatives	☐	☐	☐	☐	---
k. Development of recommendations	☐	☐	☐	☐	---
l. Monitoring the implementation of the agreement	☐	☐	☐	☐	☐
m. Other (PLEASE DESCRIBE) _____	☐	☐	☐	☐	---

***4A. If you answered that you were "somewhat involved" or "very involved" in the planning process overall, please provide the following descriptive information about the planning process:**

a. What was your role in the process?_____
b. What was the duration of the process?_____
c. How many meetings/calls were convened and at what frequency?
_____

****4B. If you answered that you were "somewhat involved" or "very involved" in the modeling process overall, please provide the following descriptive information about the modeling process:**

a. What was your role in the process?_____
b. What was the duration of the process?_____
c. How many meetings/calls were convened and at what frequency?
_____

4C. If you answered either Question 4A or 4B, please rate your agreement with the following statements about the interaction of the planning and modeling processes:

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know	Not necessary
a. The planning and modeling processes were closely integrated	☐	☐	☐	☐	☐	☐	☐	---
b. Some individuals were involved in both the planning and modeling processes	☐	☐	☐	☐	☐	☐	☐	---
c. The scope of issues addressed by the model were defined by the planning process	☐	☐	☐	☐	☐	☐	☐	---
d. Information used in the model was gathered through the planning process	☐	☐	☐	☐	☐	☐	☐	---
e. The alternatives to be evaluated in the model were defined by the planning process	☐	☐	☐	☐	☐	☐	☐	---
f. The model was modified as necessary to address feedback from the planning process	☐	☐	☐	☐	☐	☐	☐	☐

5. As a representative of your organization, what was your role in communicating with others who were not as directly involved in the process.

CHECK ALL THAT APPLY

☐ a. I was responsible for conveying information among stakeholders within my organization
☐ b. I was responsible for conveying information among stakeholders outside of my organization (PLEASE DESCRIBE) _____
☐ c. I had authority to make some decisions on behalf of my organization
☐ d. I had authority to make all decisions on behalf of my organization
☐ e. Other (PLEASE DESCRIBE) _____

6. Please indicate the extent to which agreement was reached. *(To answer this question, think about what it was that the group was charged to come up with at the end of this collaborative process. The term "agreement" as used herein refers to final recommendations made by the group to the decision maker or decision-making authority as a direct result of the collaborative modeling process.)*

PLEASE CHOOSE ONLY ONE

☐ Agreement reached on all key issues
☐ Agreement on most key issues
☐ Agreement on some key issues
☐ No agreement on any key issues, but progress was made towards addressing the issues or resolving the conflict (SKIP TO QUESTION 8)
☐ No agreement, we ended the process without making much progress (SKIP TO QUESTION 8)
☐ I was involved in the modeling process only and am not sure of the agreement status (SKIP TO QUESTION 8)
☐ The process is ongoing, and an agreement has yet to be reached (SKIP TO QUESTION 8)

USE THIS SPACE TO COMMENT: _____

_____

7. Using the scale below, rate the following statements regarding the agreement (as referred to in Question 6).

	Not at all	To a very little extent	To a little extent	To some extent	To a great extent	To a very great extent	Don't know
a. The extent to which you feel the agreement reached takes account of all key interests	☐	☐	☐	☐	☐	☐	☐
b. The extent to which you feel that the agreement reached takes account of your key interests	☐	☐	☐	☐	☐	☐	☐
c. The extent to which the agreement reached will effectively solve the problem/resolve the conflict	☐	☐	☐	☐	☐	☐	☐
d. The extent to which you are confident the agreement can be implemented.	☐	☐	☐	☐	☐	☐	☐

7A. If you rated any of the above statements "not at all," "to a very little extent," or "to a little extent," please explain.

_____

_____

8. If you had not participated in this collaborative process, what would have been the most likely process(es) (or mechanism(s)) for the issues to be addressed or resolved?

PLEASE CHOOSE ALL THAT APPLY

☐ a. Unassisted negotiation
☐ b. Judicial settlement conference
☐ c. Litigation
☐ d. Lobbying or working to achieve legislative action
☐ e. Rulemaking
☐ f. Arbitration
☐ g. Administrative proceeding (e.g., agency appeals process, contested process hearing, agency order)
☐ h. Unilateral decision by single party
☐ i. Wait for a better time to take action
☐ j. Maintain the status quo with no plans for future action
☐ k. A combination of the above (PLEASE SPECIFY) _____
☐ l. Don't know (SKIP TO QUESTION 12)
☐ m. Other (PLEASE DESCRIBE) _____

9. Please consider how the collaborative process you completed compares with the alternative that you identified in the Question 8, and then check the most appropriate of the following:

PLEASE CHOOSE ONLY ONE

☐ I feel the collaborative process was *less expensive*….and this level of expenditure was appropriate.
☐ I feel the collaborative process was *less expensive*…but additional resources were probably needed.
☐ I feel the collaborative process *cost more*…. and the extra costs *were worth* the investment.
☐ I feel the collaborative process *cost more*…and the extra costs were *not* worth the investment.
☐ Don't know

10. Please consider how the collaborative process you completed compares with the alternative that you identified in Question 8, and then check the most appropriate of the following:

PLEASE CHOOSE ONLY ONE

☐ I feel the collaborative process took *less time*…and this duration was appropriate.
☐ I feel the collaborative process took *less time*… but additional time was probably needed.
☐ I feel the collaborative process took *more time*… and the extra time *was worth* the investment.
☐ I feel the collaborative process took *more time*…and the extra time was *not* worth the investment.
☐ Don't know

11. Using the scale below, how do you think the collaborative process you completed would compare with the alternative that you selected in Question 8? (*Although it may be hard to know what would have happened with the alternative you chose in Question 8, please give us you thoughts on the following)*

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know
a. The results of the collaborative process *better* served the interests of the participants.	☐	☐	☐	☐	☐	☐	☐
b. The collaborative process made me *more* aware of other stakeholders' interests and objectives.	☐	☐	☐	☐	☐	☐	☐
c. The results of the collaborative process are *less likely* to be challenged.	☐	☐	☐	☐	☐	☐	☐
d. The participants are *more likely* to be able to work together in the future on matters related to this case or project.	☐	☐	☐	☐	☐	☐	☐
e. The collaborative process we participated in *more effectively* addressed the issues or resolved the conflict.	☐	☐	☐	☐	☐	☐	☐
f. The collaborative process we participated in led or will lead to a *more informed* public action / decision.	☐	☐	☐	☐	☐	☐	☐

*** 11A. If you rated any of the above statements "strongly disagree," "disagree," or "somewhat disagree," please explain.**

_____

_____

12. Using the scale below, please rate the extent to which the following conditions were in place (1) when the process began and (2) as a result of the process.

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know
a. The participants were able to work together cooperatively before the process began.	☐	☐	☐	☐	☐	☐	☐
b. The participants were able to work together cooperatively as a result of the process.	☐	☐	☐	☐	☐	☐	☐

13. Using the scale below, please rate the extent to which the following conditions were in place (1) when the process began and (2) as a result of the process.

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know
a. The participants trusted each other before the process began.	☐	☐	☐	☐	☐	☐	☐
b. The participants trusted each other as a result of the process.	☐	☐	☐	☐	☐	☐	☐

14. Using the scale below, please rate your level of agreement with the following:

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know
a. I had the resources (e.g., time, money) needed to participate effectively in the process.	☐	☐	☐	☐	☐	☐	☐
b. The participants, as a group, felt they were appropriately engaged in designing the process.	☐	☐	☐	☐	☐	☐	☐
c. I was involved as needed in selecting the facilitator(s).	☐	☐	☐	☐	☐	☐	☐
d. The participants, as a group, represented all affected concerns.	☐	☐	☐	☐	☐	☐	☐
e. Participants were involved in appropriate roles in the process	☐	☐	☐	☐	☐	☐	☐
f. The absence of participants had a negative effect on the collaborative process.	☐	☐	☐	☐	☐	☐	☐
g. The participants had sufficient authority to make commitments on behalf of their organizations.	☐	☐	☐	☐	☐	☐	☐
h. Changes in leadership during the process had a negative effect on the collaborative process	☐	☐	☐	☐	☐	☐	☐
i. The participants continued to be engaged so long as their involvement was necessary.	☐	☐	☐	☐	☐	☐	☐
j. The overall duration of the process had a negative effect on the collaborative process	☐	☐	☐	☐	☐	☐	☐
k. The process helped me gain a better understanding of the all of the issues to be addressed.	☐	☐	☐	☐	☐	☐	☐
l. The process helped me gain a better understanding of the other participants' views and perspectives.	☐	☐	☐	☐	☐	☐	☐
m. The process helped me identify and focus on the key issues that had to be addressed.	☐	☐	☐	☐	☐	☐	☐
n. The process helped the participants, as a group, effectively engage to work on the key issues.	☐	☐	☐	☐	☐	☐	☐
o. The participants, as a group, sought options or solutions that met the common needs of all participants.	☐	☐	☐	☐	☐	☐	☐

15. Please identify your level of familiarity and/or involvement in the model development, testing, and/or application:

PLEASE CHOOSE ONLY ONE

☐ I was involved in at least one aspect of the modeling process (e.g., identifying objectives, identifying variables and relationships, testing the model, etc.)
☐ I was not directly involved but am familiar enough with the modeling process to answer questions about it
☐ I was not involved and am not familiar enough with the modeling process to answer questions about it (SKIP TO QUESTION 17)

16. Using the scale below, please rate your level of agreement with the following based on your participation in the modeling process:

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Not applicable	Don't know
a. Participants in the modeling process were involved in defining the overall purpose and use of the model.	☐	☐	☐	☐	☐	☐	☐	☐
b. Participants in the modeling process were involved in identifying data sources, variables, and assumptions to be used in the model.	☐	☐	☐	☐	☐	☐	☐	☐
c. Participants in the modeling process were involved in defining and/or structuring the causal relationships among variables in the model.	☐	☐	☐	☐	☐	☐	☐	☐
d. Participants in the modeling process understood how their questions would be addressed by the model.	☐	☐	☐	☐	☐	☐	☐	☐
e. Participants in the modeling process were involved in characterizing the status quo (i.e., current approach to the resource management issue) and the assumptions used for the status quo.	☐	☐	☐	☐	☐	☐	☐	☐
f. Participants in the modeling process were involved in formulating alternatives to the status quo to be tested.	☐	☐	☐	☐	☐	☐	☐	☐
g. Participants in the modeling process were involved in validating/testing the model.	☐	☐	☐	☐	☐	☐	☐	☐
h. Participants were encouraged to directly interact with the model via the interface.	☐	☐	☐	☐	☐	☐	☐	☐
i. Modeling results were available in a short enough timeframe to meet the needs of the collaborative process.	☐	☐	☐	☐	☐	☐	☐	☐

17. Using the scale below, please rate your agreement with the following. *(note that this question should be answered by those who were directly involved in the collaborative modeling as well as those who were less involved in the modeling but, nonetheless, experienced its impacts on the overall process)*

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know
a. The modeling process improved the extent to which relevant information was integrated into the process (relative to what would have been the case in the absence of the model).	☐	☐	☐	☐	☐	☐	☐
b. The model addressed all key interests.	☐	☐	☐	☐	☐	☐	☐
c. The model addressed your key interests	☐	☐	☐	☐	☐	☐	☐
d. The model balanced participants' key interests in an unbiased way.	☐	☐	☐	☐	☐	☐	☐
e. The model presented a realistic portrayal of the relative impacts of different resource management alternatives.	☐	☐	☐	☐	☐	☐	☐
f. I trust the technical information used in the model.	☐	☐	☐	☐	☐	☐	☐
g. The model was accessible by all participants, regardless of their technical background.	☐	☐	☐	☐	☐	☐	☐
h. Participants had adequate opportunities to evaluate scenarios of interest to them using the model.	☐	☐	☐	☐	☐	☐	☐

18. Using the scale below, please rate your level of agreement with the following:

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know	Not applicable
a. We worked effectively to identify information needs.	☐	☐	☐	☐	☐	☐	☐	---
b. All participants had full access to relevant information they needed in order to participate effectively in this collaborative process.	☐	☐	☐	☐	☐	☐	☐	---
c. The quality of the information used was good enough for the process.	☐	☐	☐	☐	☐	☐	☐	---
d. Key information was missing which raised important doubt regarding some aspect of the model.	☐	☐	☐	☐	☐	☐	☐	---
e. Relevant information was effectively integrated into the process (e.g., a project web site was used to share information, spatial analysis and decision support tools were used).	☐	☐	☐	☐	☐	☐	☐	---
f. As a group, participants gained a better understanding of the nature and magnitude of impacts of different resource management alternatives on their interests other than their own.	☐	☐	☐	☐	☐	☐	☐	---
g. As a result of my involvement, I was better able to convey relevant information among the stakeholders and/or decision-makers who I represented.	☐	☐	☐	☐	☐	☐	☐	☐
h. The agreement(s) reached was (were) improved as a result of information integrated into the process.	☐	☐	☐	☐	☐	☐	☐	☐

19. Using the scale below, please rate your agreement with the following:

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Not applicable	Don't know
a. The evaluation of alternatives was better informed as a result of the collaborative fact finding process.	☐	☐	☐	☐	☐	☐	☐	☐
b. The evaluation of alternatives was better informed as a result of the collaborative modeling process.	☐	☐	☐	☐	☐	☐	☐	☐
c. The trade-offs among stakeholder interests associated with different alternatives were more clearly articulated as a result of the collaborative modeling process.	☐	☐	☐	☐	☐	☐	☐	☐
d. The comparison of alternatives was more credible as a result of the collaborative modeling process.	☐	☐	☐	☐	☐	☐	☐	☐
e. The modeling process took into account implementation factors and helped the process focus on implementable options.	☐	☐	☐	☐	☐	☐	☐	☐
f. The modeling process helped to address the problem/resolve the conflict.	☐	☐	☐	☐	☐	☐	☐	☐
g. The alternatives evaluated using the collaborative modeling process contributed to the development of the recommended plan.	☐*	☐*	☐*	☐	☐	☐	☐	☐
h. Actions taken (or planned) to address the resource management issue are consistent with the recommended plan.	☐**	☐**	☐**	☐	☐	☐	☐	☐

***19A. If you rated Question 19g as "strongly disagree," "disagree," or "somewhat disagree," please identify the reason(s) for the lack of continuity between the modeling process and recommended plan.**

PLEASE CHOOSE ALL THAT APPLY:

- ☐ There was little overlap between the individuals participating in the planning process and the individuals participating in the modeling process
- ☐ One or more participants in the planning process felt that their interests were not adequately represented in the modeling process
- ☐ The model rationale and/or results were not clearly understood by those who developed the recommended plan
- ☐ The model did not account for key information, interests, and/or implementation considerations (e.g., legal constraints)
- ☐ Model results were not available at the time of the negotiation of the recommendation plan.
- ☐ Other (PLEASE DESCRIBE) _____

****19B. If you rated Question 19h as "strongly disagree," "disagree," or "somewhat disagree," please identify the reason(s) for inconsistency between actions taken (or planned) and the recommended plan.**

- ☐ Alternative recommendations that came from sources outside of the collaborative planning process were used (or will be used) as the basis for action
- ☐ One or more participants in the collaborative planning process developed alternative recommendations after the process was complete that were used (or will be used) as the basis for action
- ☐ New information and/or key interests were identified but the process was not reconvened
- ☐ Legal constraints were identified that required a different planning approach and different actions
- ☐ Agreements required by the recommended plan were too complex
- ☐ Too much time passed between the conclusion of the planning process and action
- ☐ Other (PLEASE DESCRIBE: _____)

20. How many "practitioners," including facilitators and modelers, supported the process? For the purpose of this questionnaire, these roles are defined as follows:

Facilitator – a neutral party who seeks to assist a group of individuals or other parties to constructively discuss a number of complex, potentially controversial issues

Modeler – a neutral or trusted party who is responsible for developing the model through technical coding

PLEASE FOCUS ON THE PRINCIPAL PRACTITIONERS IN THE PROCESS - E.G., LEAD FACILITATOR; IF MORE THAN THREE PRINCIPAL PRACTITIONERS SUPPORTED THE PROCESS, CHOOSE THE THREE WITH WHOM YOU HAD THE MOST EXPERIENCE, AND ANSWER QUESTIONS 21 AND 22 FOR THOSE THREE PRACTITIONERS.

- ☐ One
- ☐ Two
- ☐ Three
- ☐ More than three

21. Please identify the facilitators and/or modelers involved in the process by entering their initials in the space provided and identifying the choice(s) that best describe their role and/or roles in the process. *(note that for some processes, one person may serve more than one role – if this is the case, select all of the roles that the person served)*

Facilitator's / Modeler's Initials	Roles Served (CHECK ALL THAT APPLY)		
	Facilitator	Modeler	Not Sure
_____	☐	☐	☐
_____	☐	☐	☐
_____	☐	☐	☐

22. Using the scale below, please rate the following for each of the facilitators / modelers identified in Question 21.

NOTE THAT SOME OF THE FOLLOWING STATEMENTS REFER TO A SPECIFIC ROLE – FACILITATOR OR MODELER. IF A STATEMENT DOES NOT MENTION ONE OF THE ROLES SERVED BY THE PRACTITIONER THAT YOU ARE RATING, SELECT "NOT APPLICABLE." FOR EXAMPLE, IF YOU WERE RATING A PRACTITIONER WHO SERVED AS A FACILITATOR ONLY, YOU WOULD PROVIDE A RATING FOR STATEMENT "B" AND ANSWER "NOT APPLICABLE" IN RESPONSE TO STATEMENT "C." IF THE PRACTITIONER SERVED BOTH THE FACILITATOR AND MODELER ROLES, YOU WOULD PROVIDE A RATING FOR BOTH STATEMENTS "B" AND "C."

22-1. Initials of first facilitator / modeler identified above ___

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Not Applicable
a. On reflection, this was the right **facilitator / modeler** to guide the planning and/or modeling process.	☐	☐	☐	☐	☐	☐	☐
b. The **facilitator** kept us on track and proceeding in a timely manner.	☐	☐	☐	☐	☐	☐	☐
c. The **modeler** was able to explain to participants with varying levels of experience how the modeling process would work	☐	☐	☐	☐	☐	☐	☐
d. The **facilitator** helped us manage technical discussions efficiently.	☐	☐	☐	☐	☐	☐	☐
e. The **facilitator** dealt with all the participants in a fair and unbiased manner.	☐	☐	☐	☐	☐	☐	☐
f. When things got tense, the **facilitator** was able to help us find ways to move forward constructively.	☐	☐	☐	☐	☐	☐	☐
g. When necessary, the **facilitator / modeler** brought in neutral topical experts to help address technical questions and/or resolve differences in interpretation of factual information.	☐	☐	☐	☐	☐	☐	☐
h. The **facilitator** made sure that the views and perspectives of all participants were considered in the process.	☐	☐	☐	☐	☐	☐	☐
i. The **modeler** made sure that all participants had adequate opportunity to participate in decisions about model structure and data inputs	☐	☐	☐	☐	☐	☐	☐
j. The **facilitator** made sure that no one dominated the process or other participants.	☐	☐	☐	☐	☐	☐	☐
k. The **modeler** was able to explain in an intuitive way how the model input was reflected the model output (e.g., how different input assumptions affected the output)	☐	☐	☐	☐	☐	☐	☐
l. The **modeler** was able to work effectively with the group to create an interface and/or to display results in a manner that was useful to participants.	☐	☐	☐	☐	☐	☐	☐
m. The **facilitator** helped the participants test the practicality of the options under discussion.	☐	☐	☐	☐	☐	☐	☐
n. The **facilitator** was helpful in documenting our agreement.	☐	☐	☐	☐	☐	☐	☐
o. The group could not have progressed as far without the help of the **facilitator / modeler**.	☐	☐	☐	☐	☐	☐	☐

IF YOU ANSWERED "ONE" FOR QUESTION 20, SKIP TO QUESTION 23

22-2. Initials of second facilitator / modeler identified above ___

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Not Applicable
a. On reflection, this was the right **facilitator / modeler** to guide the planning and/or modeling process.	☐	☐	☐	☐	☐	☐	☐
b. The **facilitator** kept us on track and proceeding in a timely manner.	☐	☐	☐	☐	☐	☐	☐
c. The **modeler** was able to explain to participants with varying levels of experience how the modeling process would work	☐	☐	☐	☐	☐	☐	☐
d. The **facilitator** helped us manage technical discussions efficiently.	☐	☐	☐	☐	☐	☐	☐
e. The **facilitator** dealt with all the participants in a fair and unbiased manner.	☐	☐	☐	☐	☐	☐	☐
f. When things got tense, the **facilitator** was able to help us find ways to move forward constructively.	☐	☐	☐	☐	☐	☐	☐
g. When necessary, the **facilitator / modeler** brought in neutral topical experts to help address technical questions and/or to resolve differences in interpretation of factual information.	☐	☐	☐	☐	☐	☐	☐
h. The **facilitator** made sure that the views and perspectives of all participants were considered in the process.	☐	☐	☐	☐	☐	☐	☐
i. The **modeler** made sure that all participants had adequate opportunity to participate in decisions about model structure and data inputs	☐	☐	☐	☐	☐	☐	☐
j. The **facilitator** made sure that no one dominated the process or other participants.	☐	☐	☐	☐	☐	☐	☐
k. The **modeler** was able to explain in an intuitive way how the model input was reflected the model output (e.g., how different input assumptions affected the output)	☐	☐	☐	☐	☐	☐	☐
l. The **modeler** was able to work effectively with the group to create an interface and/or display results in a manner that was useful to participants.	☐	☐	☐	☐	☐	☐	☐
m. The **facilitator** helped the participants test the practicality of the options under discussion.	☐	☐	☐	☐	☐	☐	☐
n. The **facilitator** was helpful in documenting our agreement.	☐	☐	☐	☐	☐	☐	☐
o. The group could not have progressed as far without the help of the **facilitator / modeler**.	☐	☐	☐	☐	☐	☐	☐

IF YOU ANSWERED "TWO" FOR QUESTION 20, SKIP TO QUESTION 23

22-3. Initials of third facilitator / modeler identified above ___

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Not Applicable
a. On reflection, this was the right **facilitator / modeler** to guide the planning and/or modeling process.	☐	☐	☐	☐	☐	☐	☐
b. The **facilitator** kept us on track and proceeding in a timely manner.	☐	☐	☐	☐	☐	☐	☐
c. The **modeler** was able to explain to participants with varying levels of experience how the modeling process would work	☐	☐	☐	☐	☐	☐	☐
d. The **facilitator** helped us manage technical discussions efficiently.	☐	☐	☐	☐	☐	☐	☐
e. The **facilitator** dealt with all the participants in a fair and unbiased manner.	☐	☐	☐	☐	☐	☐	☐
f. When things got tense, the **facilitator** was able to help us find ways to move forward constructively.	☐	☐	☐	☐	☐	☐	☐
g. When necessary, the **facilitator / modeler** brought in neutral topical experts to help address technical questions and/or resolve differences in interpretation of factual information.	☐	☐	☐	☐	☐	☐	☐
h. The **facilitator** made sure that the views and perspectives of all participants were considered in the process.	☐	☐	☐	☐	☐	☐	☐
i. The **modeler** made sure that all participants had adequate opportunity to participate in decisions about model structure and data inputs	☐	☐	☐	☐	☐	☐	☐
j. The **facilitator** made sure that no one dominated the process or other participants.	☐	☐	☐	☐	☐	☐	☐
k. The **modeler** was able to explain in an intuitive way how the model input was reflected the model output (e.g., how different input assumptions affected the output)	☐	☐	☐	☐	☐	☐	☐
l. The **modeler** was able to work effectively with the group to create an interface and/or to display results in a manner that was useful to participants.	☐	☐	☐	☐	☐	☐	☐
m. The **facilitator** helped the participants test the practicality of the options under discussion.	☐	☐	☐	☐	☐	☐	☐
n. The **facilitator** was helpful in documenting our agreement.	☐	☐	☐	☐	☐	☐	☐
o. The group could not have progressed as far without the help of the **facilitator / modeler**.	☐	☐	☐	☐	☐	☐	☐

23. Using the scale below, please rate the following statements for processes that involved a modeler/modeling team who worked with a separate facilitator:

☐ Not Applicable, roles were not separate (SKIP TO QUESTION 24)

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
a. There was a clear distribution of roles and responsibilities between the modeler and facilitator	☐	☐	☐	☐	☐	☐
b. The modeler and facilitator understood and respected each others' roles.	☐	☐	☐	☐	☐	☐
c. The modeler and facilitator supported each other and worked effectively together.	☐	☐	☐	☐	☐	☐

24. Think back to the start of the process and please rate the following using the scale below:

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Not Applicable
a. At the start of the process, I was willing to work cooperatively with other participants in this process.	☐	☐	☐	☐	☐	☐	☐

25. Using the scale below, please rate your agreement with the following statements:

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree	Don't know
a. I would recommend this type of process to my colleagues in a similar situation without hesitation.	☐	☐	☐	☐	☐	☐	☐
b. We could not have progressed as far using any other process of which I am aware.	☐	☐	☐	☐	☐	☐	☐
c. The process would not have achieved as much without the use of collaborative modeling.	☐	☐	☐	☐	☐	☐	☐

26. At this point in time, in very general terms what did this collaborative process accomplish?

CHECK ALL THAT APPLY

☐ a. A potentially costly or divisive dispute was *likely* avoided.
☐ b. An impasse (stalemate) was broken.
☐ c. A crisis was averted.
☐ d. Conflict didn't escalate.
☐ e. Costly or protracted litigation was avoided.
☐ f. Participants gained a greater understanding of the complexities and uncertainties associated with the issue
☐ g. Participants gained a greater appreciation for all of the interests involved
☐ h. Relationships among parties in this process were improved.
☐ i. The process resulted in timely decisions and outcomes
☐ j. Participants agreed to work together to address future problems/resolve future conflicts in a collaborative manner
☐ k. Nothing was accomplished.
☐ l. The process made the issues or dispute worse.

USE THIS SPACE TO COMMENT: _____

_____

27. What is your top suggestion on how this collaborative process could have been improved?

PLEASE WRITE "NONE" IF YOU FEEL THIS PROCESS COULD NOT HAVE BEEN IMPROVED

_____

_____

28. From your perspective, what will be the long-term effect(s) (e.g., positive or negative impacts) of the collaborative process?

PLEASE IDENTIFY EFFECT(S) IN EACH OF THE CATEGORIES LISTED BELOW THAT WERE ADDRESSED BY THE COLLABORATIVE PROCESS AND/OR ADD YOUR OWN CATEGORIES AS APPROPRIATE. IF A CATEGORY WAS ADDRESSED BUT NO EFFECTS ARE EXPECTED, PLEASE WRITE "NONE." IF A CATEGORY WAS NOT ADDRESSED, PLEASE WRITE "NA."

	Effect(s) of the process
Natural resources and environmental conditions	_____
	_____
Historic and cultural resources	_____
	_____
Community and social Conditions	_____
	_____
Economic conditions	_____
	_____
Recreational Uses	_____
	_____
Other, please specify	_____
	_____

Thank you for taking the time to complete this questionnaire.
Your assistance in providing this information is *very* much appreciated.

Appendix E: Suite of Performance Measures

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
1. Setting, Activity, and Resource Measures. Purpose: to capture information about the problem setting, planning and modeling processes employed, and the quality of "inputs" to the process (e.g., the model building team). This information defines the conditions under which the process took place, including conditions that are both within and not within the process designers' and implementers' control. These measures can be used to help establish the influence of different process design and implementation choices on critical outcomes under different circumstances.		
1a. Planning Setting Measures (focus: key characteristics of the setting within which planning processes were convened)		
1a1. Problem focus Description: Identification of resource management issue(s) being addressed by collaborative planning and modeling processes Focus: setting (exogenous)	3. Please identify the concerns that were considered during the collaborative process, and use the scale below to rank these concerns based on what *you believe* were the highest priorities. o Agriculture o Air Quality o Archeology or Historic Preservation o Coastal Zone or Marine Management o Ecosystem Management o Endangered Species and/or Critical Habitat o Energy o Facility (dam) Reoperation o Forest and Timber Management o Flood Damage Reduction (Flood Control) o Stream Flow Regime o Land Use and Urban Development o Mining o Native American, Alaska Native, Native Hawaiian Issues o Navigation o Parks and Refuges o Recreational Use and Access o Solid or Hazardous Waste o Transportation o Vegetation/Riparian Management o Watershed/River Basin Management o Water Demand Management o Water Quality o Water Supply o Wildlife Management o Other categories (please describe)	– Areas for possible future development: Consider defining "agriculture" more finely to distinguish between irrigation and grazing.

Suite of Performance Measures and Relationship to Survey Instrument
Performance Measures to Assess the Benefits of Collaborative Modeling

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
1a2. Level of certainty and clarity Description: Characterization of the extent to which the problem is well-defined, in terms of level of certainty and extent to which the separation between facts and values is clear Focus: conditions at outset of process (exogenous)	18c. Using the scale below, please rate your level of agreement with the following: The quality of the information used was good enough for the process.	– Interpretation: Existing question may be interpreted differently by different respondents. To serve as an exogenous variable, would be useful to specify interest in quality of data "at the outset of the process." – Related measures (survey questions): 2a4(18d), 2c1(26f) – Areas for possible future development: Consider pre-post questions in conjunction with measure 2c1 (changes in knowledge) and 2c2 (changes in awareness and understanding) to measure impact of processes on improvements in level of certainty/clarity.
1a3. Level of conflict Description: Characterization of level of conflict (e.g., degree of consensus or diversity of opinion) at the outset of the collaborative modeling process Focus: conditions at outset of process (exogenous)	12a. Using the scale below, please rate the extent to which the following conditions were in place…: The participants were able to work together cooperatively before the process began. 13a. Using the scale below, please rate the extent to which the following conditions were in place…: The participants trusted each other before the process began. 24a. Think back to the start of the process and please rate the following using the scale below: At the start of the process, I was willing to work cooperatively with other participants in this process.	– Interpretation: Existing questions provide foundation for pre-post evaluation of change in trust and cooperation (measures 2c3 and 2c4). – Related measures (survey questions): 2c3(13b), 2c4(12b) – Areas for possible future development: Consider questions about divergence in values and interests among stakeholders, which can be assessed by respondents and may be more indicative of institutional conditions.

Suite of Performance Measures and Relationship to Survey Instrument
Performance Measures to Assess the Benefits of Collaborative Modeling

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
1a4. Institutional context Description: Characterization of complexity of the broader institutional environment within which water resource planning decisions are being made and implemented Focus: setting (exogenous)	8. If you had not participated in this collaborative process, what would have been the most likely process(es) (or mechanism(s)) for the issues to be addressed or resolved? (all that apply) o Unassisted negotiation o Judicial settlement conference o Litigation o Lobbying or working to achieve legislative action o Rulemaking o Arbitration o Administrative proceeding (e.g., agency appeals process, contested process hearing, agency order) o Unilateral decision by single party o Wait for a better time to take action o Maintain the status quo for no plans for future action o A combination of the above (Please specify) o Don't know (skip to Question 12) o Other (Please describe)	– Interpretation: Question 8 serves as basis for counterfactual questions (Questions 9-11). – Related measures (survey questions): 2c2(11b), 2c9(11a,11c,11e,11f), 2c13(11d), 2d2(9,10) – Areas for possible future development: – Consider measures that provide more descriptive information about institutional characteristics – e.g., based on "institutional constellations" framework (Jordana and Levi-Faur, 2004), including degree of fragmentation, degree of dispersion, and degree of centralization. – Consider revising question 8 to ask respondents to rate each alternative process/mechanism based on likelihood it would have been used.
1b. Stakeholder Participation Process Measures (focus: approach used to engage stakeholders in planning and modeling processes and actual stakeholder engagement)		
1b1. Stakeholder participation process design and implementation Description: Design and implementation of the overall stakeholder participation process, covering stakeholder participation in both planning and modeling processes Focus: process characteristics (exogenous)	14b. Using the scale below, please rate your level of agreement with the following: The participants, as a group, felt they were appropriately engaged in designing the process. 14c. Using the scale below, please rate your level of agreement with the following: I was involved as needed in selecting the facilitator(s). 14e. Using the scale below, please rate your level of agreement with the following: Participants were involved in appropriate roles in the process 18b. Using the scale below, please rate your level of agreement with the following: All participants had full access to relevant information they needed in order to participate effectively in this collaborative process.	– Interpretation: – Focus of these questions in on process design vs. actual stakeholder participation (ref. measure 1b2). – Respondents may not make distinction between planning and modeling processes; processes may not be distinct in all cases. Therefore, stakeholder participation is treated in total. Refer to answers to Questions 4 and 4C to help interpret response data. – Related measures (survey questions): 1b2(all), 1d4(all), 3b2(4,5) – Areas for possible future development: – Consider additional measures to help interpret data regarding actual stakeholder participation (ref.

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
	22g. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: When necessary, the facilitator/modeler brought in neutral topical experts to help address technical questions and/or resolve differences in interpretation of factual information.	comment under measure 1b2). – Consider developing separate, parallel measures, one set addressing design and implementation of stakeholder participation in the planning process and one set addressing the modeling process.
1b2. Actual stakeholder participation in planning and modeling processes <u>Description</u>: Degree of actual stakeholder participation in the planning and modeling processes, including measures of representativeness of stakeholders who actually participated <u>Focus</u>: mixed – process characteristics (exogenous) – process outcomes (endogenous)	14a. Using the scale below, please rate your level of agreement with the following: I had the resources (e.g., time, money) needed to participate effectively in the process.	– <u>Interpretation</u>: – Stakeholder participation could be function of process design and implementation (factors within the control of the process designer/implementer) or stakeholder choices (factors outside of the control of process designers/implementers). – Respondents may not make distinction between planning and modeling processes and/or processes may not be distinct in all cases. Refer to answers to Questions 4 and 4C to help interpret response data. – <u>Related measures (survey questions)</u>: 1b1(all), 1d4(all), 3b2(4,4Ba,15), 3b2(5) – <u>Areas for possible future development</u>: – Consider development of parallel questions focused on design and implementation (e.g., parallel to Question 14d: the process was designed to include participants representing all affected concerns). – Consider separate questions for planning and modeling processes, each specifying focus of question (i.e., “planning process” or “modeling process” instead of unspecified “process”).
	14d. Using the scale below, please rate your level of agreement with the following: The participants, as a group, represented all affected concerns.	
	14f. Using the scale below, please rate your level of agreement with the following: The absence of participants had a negative effect on the collaborative process.	
	14g. Using the scale below, please rate your level of agreement with the following: The participants had sufficient authority to make commitments on behalf of their organizations.	
	14h. Using the scale below, please rate your level of agreement with the following: Changes in leadership during the process had a negative effect on the collaborative process	
	14i. Using the scale below, please rate your level of agreement with the following: The participants continued to be engaged so long as their involvement was necessary.	

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
1c. Planning Process Measures (focus: description of planning processes employed and characterization of quality of model building team)		
1c1. Planning process description Description: Factual information about planning processes Focus: process characteristics (exogenous)	4Ab. If you answered [in response to Question 4] that you were "somewhat involved" or "very involved" in the planning process overall, please provide the following descriptive information about the planning process: What was the duration of the process?	– Interpretation: Also refer to data from stakeholder participation process measure (1b1). – Related measures (survey questions): 1b1(all) – Areas for possible future development: If separate measures are developed for stakeholder participation in the design and implementation of planning versus modeling processes, consider combining this with planning-specific stakeholder process measure.
	4Ac. If you answered [in response to Question 4] that you were "somewhat involved" or "very involved" in the planning process overall, please provide the following descriptive information about the planning process: How many meetings/calls were convened and at what frequency?	
1c2. Quality of facilitation team Description: Characterization of quality of the facilitators in the collaborative planning process Focus: process characteristics (exogenous)	22a. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: On reflection, this was the right facilitator/modeler to guide the planning and/or modeling process.	– Interpretation: Questions are designed so can relate responses to specific practitioner with specific role, as defined by respondent (see endnote 3). – Related measures (survey questions): 1b1(all), 1d5(23a-23c)
	22b. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: The facilitator kept us on track and proceeding in a timely manner.	
	22d. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: The facilitator helped us manage technical discussions efficiently.	
	22e. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: The facilitator dealt with all the participants in a fair and unbiased manner.	
	22f. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: When things got tense, the facilitator was able to help us find ways to move forward constructively.	

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
	22h. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: The facilitator made sure that the views and perspectives of all participants were considered in the process.	
	22j. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: The facilitator made sure that no one dominated the process or other participants.	
	22m. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: The facilitator helped the participants test the practicality of the options under discussion.	
	22n. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: The facilitator was helpful in documenting our agreement.	
	22o. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: The group could not have progressed as far without the help of the facilitator/ modeler.	
1d. Model Setting and Modeling Process Measures (<u>focus</u>: characterization of data setting, description of model platform and modeling processes employed, and characterization of quality of model building team)		
1d1. Fact finding process design and implementation <u>Description</u>: Nature and description of fact finding processes <u>Focus</u>: process characteristics (exogenous)	No questions directly address this measure.	– <u>Interpretation</u>: Some inferences might be available in the data from Questions 18a, 18d, and 22g., but no questions ask about fact finding process (post-identifying needs). – <u>Related measures (survey questions)</u>: 1a2(18c), 1b1(22g), 2a3(17f,18d), 2b1(18a), 2b2(19a) – <u>Areas for possible future development</u>: Consider questions to gather information about how participants addressed information needs (where there were gaps) and how participants resolved differences in interpretation of available information. Relate questions to uncertainty at the outset of the process (measure 1a2) and changes in knowledge, awareness, and understanding (measures 2c1, 2c2).

Suite of Performance Measures and Relationship to Survey Instrument
Performance Measures to Assess the Benefits of Collaborative Modeling

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
1d2. Model description/platform Description: Factual information about the modeling tool(s) used in a collaborative modeling process, including model type/platform Focus: process characteristics (exogenous)	No questions directly address this measure.	– Related measures (survey questions): 1d3(16h), 1d5(22i,22l), 2a3(16i) – Areas for possible future development: Consider questions about: – Modeling environment – Nature of interface – Description of meetings associated with building, testing, and using the model
1d3. Modeling process description Description: Factual information about modeling processes including tools and activities employed to identify and convene stakeholders in the development, testing, and use of the model Focus: process characteristics (exogenous)	4Bb. If you answered [in response to Question 4] that you were "somewhat involved" or "very involved" in the modeling process overall, please provide the following descriptive information about the modeling process: What was the duration of the process?	– Interpretation: Consider participants' responses to questions about the nature of involvement in the planning and modeling processes (Questions 4 and 15) to account for the influence of perspectives when interpreting responses to Question 16. – Related measures (survey questions): 1b1(all), 2c8(19A), 3b2(4,15)
	4Bc. If you answered [in response to Question 4] that you were "somewhat involved" or "very involved" in the modeling process overall, please provide the following descriptive information about the modeling process: How many meetings/calls were convened and at what frequency?	
	16a. Using the scale below, please rate your level of agreement with the following based on your participation in the modeling process: Participants in the modeling process were involved in defining the overall purpose and use of the model.	
	16b. Using the scale below, please rate your level of agreement with the following based on your participation in the modeling process: Participants in the modeling process were involved in identifying data sources, variables, and assumptions to be used in the model.	
	16c. Using the scale below, please rate your level of agreement with the following based on your participation in the modeling process: Participants in the modeling process were involved in defining and/or structuring the causal relationships among variables in the model.	

Performance Measure			Associated Survey Question[1,2,3]	Implementation Notes[4]
			16d. Using the scale below, please rate your level of agreement with the following based on your participation in the modeling process: Participants in the modeling process understood how their questions would be addressed by the model.	
			16e. Using the scale below, please rate your level of agreement with the following based on your participation in the modeling process: Participants in the modeling process were involved in characterizing the status quo (i.e., current approach to the resource management issue) and the assumptions used for the status quo.	
			16f. Using the scale below, please rate your level of agreement with the following based on your participation in the modeling process: Participants in the modeling process were involved in formulating alternatives to the status quo to be tested.	
			16g. Using the scale below, please rate your level of agreement with the following based on your participation in the modeling process: Participants in the modeling process were involved in validating/testing the model.	
			16h. Using the scale below, please rate your level of agreement with the following based on your participation in the modeling process: Participants were encouraged to directly interact with the model via the interface.	
		1d4. Integration of planning and modeling processes Description: Factual information about the integration of planning and modeling processes Focus: process characteristics (exogenous)	4Ca. If you answered either Question 4A or 4B, please rate your agreement with the following statements about the interaction of the planning and modeling processes: The planning and modeling processes were closely integrated.	– Interpretation: Consider participants' responses to questions about the nature of involvement in the planning and modeling processes (Questions 4 and 15) to account for the influence of perspectives when interpreting responses to Question 4C. – Related measures (survey questions): 3b2(4,15)
			4Cb. If you answered either Question 4A or 4B, please rate your agreement with the following statements about the interaction of the planning and modeling processes: Some individuals were involved in both the planning and modeling processes.	

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
	4Cc. If you answered either Question 4A or 4B, please rate your agreement with the following statements about the interaction of the planning and modeling processes: The scope of issues addressed by the model were defined by the planning process.	
	4Cd. If you answered either Question 4A or 4B, please rate your agreement with the following statements about the interaction of the planning and modeling processes: Information used in the model was gathered through the planning process.	
	4Ce. If you answered either Question 4A or 4B, please rate your agreement with the following statements about the interaction of the planning and modeling processes: The alternatives to be evaluated in the model were defined by the planning process.	
	4Cf. If you answered either Question 4A or 4B, please rate your agreement with the following statements about the interaction of the planning and modeling processes: The model was modified as necessary to address feedback from the planning process.	
1d5. Quality of model building team Description: Characterization of quality of the modelers in the collaborative modeling process Focus: process characteristics (exogenous)	22a. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: On reflection, this was the right facilitator/modeler to guide the planning and/or modeling process.	– Interpretation: Questions are designed so can relate responses to specific practitioner with specific role, as defined by respondent (see endnote 3). – Related measures (survey questions): 1d3(all), 2a1(all), 2a2(all), 2a3(all), 2a4(all)
	22c. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: The modeler was able to explain to participants with varying levels of experience how the modeling process would work	
	22i. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: The modeler made sure that all participants had adequate opportunity to participate in decisions about model structure and data inputs	

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Performance Measure			Associated Survey Question[1,2,3]	Implementation Notes[4]
			22k. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: The modeler was able to explain in an intuitive way how the model input was reflected the model output (e.g., how different input assumptions affected the output)	
			22l. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: The modeler was able to work effectively with the group to create an interface and/or to display results in a manner that was useful to participants.	
			22o. Using the scale below, please rate the following for each of the facilitators/modelers identified in Question 21: The group could not have progressed as far without the help of the facilitator / modeler.	
			23a. Using the scale below, please rate the following statements for processes that involved a modeler/modeling team who worked with a separate facilitator: There was a clear distribution of roles and responsibilities between the modeler and facilitator	
			23b. Using the scale below, please rate the following statements for processes that involved a modeler/modeling team who worked with a separate facilitator: The modeler and facilitator understood and respected each others' roles.	
			23c. Using the scale below, please rate the following statements for processes that involved a modeler/modeling team who worked with a separate facilitator: The modeler and facilitator supported each other and worked effectively together.	

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Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
2. Collaborative Modeling Outcome Measures. Purpose: to capture immediate, intermediate, and long-term outcomes of the collaborative modeling process. This information will define the "dependent" variables used to assess the benefits of collaborative modeling. In some cases, immediate and intermediate measures will also be used as independent variables used to assess higher order outcomes (e.g., quality of recommendations could be regressed on change in awareness/understanding to establish this link to modeling outcomes).		
2a. Model-Level Outcome Measures (focus: outcomes of collaborative process in terms of the quality of the model used to evaluate resource management alternatives)		
2a1. Integration of stakeholder interests in model Description: Degree to which model was customized to accommodate stakeholder objectives, binding constraints, and management alternatives, including controls for bias Focus: model quality outcome (mixed) – Endogenous relative to setting and process characteristics – Exogenous relative to modeling process and planning process outcomes	17b. Using the scale below, please rate your agreement with the following: The model addressed all key interests. 17c. Using the scale below, please rate your agreement with the following: The model addressed your key interests 17d. Using the scale below, please rate your agreement with the following: The model balanced participants' key interests in an unbiased way.	– Interpretation: Key measure of quality of resource management action is whether it balances all key interests. Along with questions regarding whether the recommendation balanced all interests and whether actions were consistent with recommendations, this measure will help interpret the affect of collaborative modeling on this outcome. – Related measures (survey questions): 1b1(18b), 1b2(14a,14d,14f,14g), 1c2(22e,22h,22j), 1d3(16a,16d), 1d4(4Cc,4Cf), 2b2(19c), 2c1(18f), 2c8(19A), 2c9(7a,7b), 2c9(11a), 2c11(19B) – Areas for possible future development: Consider question asking whether the model was customized to accommodate all key interests.
2a2. Model transparency Description: Degree of model transparency in construction and operation, including degree to which model users understood correspondence between model inputs and outputs Focus: model quality outcome (mixed) – Endogenous relative to setting and process characteristics – Exogenous relative to modeling process and planning process outcomes	No questions directly address this measure	– Interpretation: Inferences could be drawn from responses to questions 18f and 19c. – Related measures (survey questions): 1d3(16b,16c,16g), 1d5(22k), 2b2(19c), 2c2(18f) – Areas for possible future development: Consider questions regarding participants' understanding of: – How data sources, relationships, and assumptions were incorporated in the model – Why different scenarios resulted in differences in the direction and magnitude of impacts on key interests relative to other scenarios

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
2a3. Interactive capacity of model Description: Characterization of model qualities such as flexibility to interactively evaluate alternatives, and usability of interface and model levels Focus: model quality outcome (mixed) – Endogenous relative to setting and process characteristics – Exogenous relative to modeling process and planning process outcomes	17g. Using the scale below, please rate your agreement with the following: The model was accessible by all participants, regardless of their technical background. 17h. Using the scale below, please rate your agreement with the following: Participants had adequate opportunities to evaluate scenarios of interest to them using the model. 16i. Using the scale below, please rate your level of agreement with the following based on your participation in the modeling process: Modeling results were available in a short enough timeframe to meet the needs of the collaborative process.	– Related measures (survey questions): 1d3(16h), 1d5(22l), 2c8(19A)
2a4. Confidence in the model Description: characterization of the confidence in the model developed using the collaborative modeling process Focus: model quality outcome (mixed) – Endogenous relative to setting and process characteristics – Exogenous relative to modeling process and planning process outcomes	17e. Using the scale below, please rate your agreement with the following: The model presented a realistic portrayal of the relative impacts of different resource management alternatives 17f. Using the scale below, please rate your agreement with the following: I trust the technical information used in the model. 18d. Using the scale below, please rate your level of agreement with the following: Key information was missing which raised important doubt regarding some aspect of the model.	– Interpretation: Critical antecedent to quality of alternatives evaluation process (measure 2b2) and degree to which the recommendations reflected the alternatives evaluation process (measure 2c8). – Related measures (survey questions): 1a2(18c), 1d3(16g), 1d5(22l), 2b2(19d), 2c8(19A)

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
2b. Modeling Process-Level Outcome Measures (<u>focus</u>: ways in which collaborative modeling processes affected the overall planning process by changing the planning dynamics and as reflected in the quality of the evaluation of alternatives)		
2b1. Integration of available data in model <u>Description</u>: Degree to which model incorporated best available data and used methodologies to maximize data utility <u>Focus</u>: modeling process outcome (mixed) – Endogenous relative to setting, process characteristics, and model quality outcomes – Exogenous relative to planning process outcomes	17a. Using the scale below, please rate your agreement with the following: The modeling process improved the extent to which relevant information was integrated into the process (relative to what would have been the case in the absence of the model).	– <u>Interpretation</u>: Critical antecedent to changes in knowledge (measure 2c1), degree to which alternatives informed recommendations (measure 2c8) and quality of recommendations (measure 2c9). – <u>Related measures (survey questions)</u>: 1a3(12a,24a), 1b1(18b,22g), 1d1(all), 1d3(16b,16c,16e,16g), 1d4(4Cd), 2c4(12b) – <u>Areas for possible future development</u>: Consider question parallel to ECR-based question 18e but focused on specifically on modeling process.
	18a. Using the scale below, please rate your level of agreement with the following: We worked effectively to identify information needs.	
2b2. Quality of alternatives evaluation process <u>Description</u>: Extent to which model provided output and operated in a manner that improved the quality of the process of evaluating alternatives <u>Focus</u>: modeling process outcome (mixed) – Endogenous relative to setting, process characteristics, and model quality outcomes – Exogenous relative to planning process outcomes	19a. Using the scale below, please rate your agreement with the following: The evaluation of alternatives was better informed as a result of the collaborative fact finding process.	– <u>Interpretation</u>: Critical measure of the endpoint of the modeling process. – <u>Related measures (survey questions)</u>: 1c2(22m), 1d3(16f,19d), 1d4(4Ce), 2a4(17e), 2c2(18f), 2c8(19), 2c9(7d)
	19b. Using the scale below, please rate your agreement with the following: The evaluation of alternatives was better informed as a result of the collaborative modeling process.	
	19c. Using the scale below, please rate your agreement with the following: The trade-offs among stakeholder interests associated with different alternatives were more clearly articulated as a result of the collaborative modeling process.	
	19d. Using the scale below, please rate your agreement with the following: The comparison of alternatives was more credible as a result of the collaborative modeling process.	
	19e. Using the scale below, please rate your agreement with the following: The modeling process took into account implementation factors and helped the process focus on implementable options.	

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Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
2b3. Impact on planning-level outcomes Description: Extent to which problem resolution can be attributed to collaborative modeling process Focus: modeling process outcome (endogenous)	19f. Using the scale below, please rate your agreement with the following: The modeling process helped to address the problem/resolve the conflict.	– Interpretation: Overall expression of the contribution of the modeling process to agreement level outcome. – Related measures (survey questions): 2c7(6,26), 2c9(7c,11e)
2c. Planning-Level Outcome Measures (focus: manifestation of contribution of collaborative modeling in terms of: 1) the quality of recommendation resulting from the planning process; 2) the quality of resource management actions; and 3) the affects of the process on the longer-term institutional-level capacity for collaborative planning.		
2c1. Change in knowledge Description: Degree to which the collaborative modeling process addressed uncertainty and changed individuals' knowledge of the issues to be addressed Focus: planning process outcome (mixed) – Endogenous relative to setting, process characteristics, model quality outcomes, and modeling process outcomes – Exogenous relative to other planning process outcomes	14k. Using the scale below, please rate your level of agreement with the following: The process helped me gain a better understanding of the all of the issues to be addressed. 14m. Using the scale below, please rate your level of agreement with the following: The process helped me identify and focus on the key issues that had to be addressed. 18e. Using the scale below, please rate your level of agreement with the following: Relevant information was effectively integrated into the process (e.g., a project web site was used to share information, spatial analysis and decision support tools were used). 18h. Using the scale below, please rate your level of agreement with the following: The agreement(s) reached was (were) improved as a result of information integrated into the process. 26f. At this point in time, in very general terms what did this collaborative process accomplish? (Check all that apply): Participants gained a greater understanding of the complexities and uncertainties associated with the issue.	– Interpretation: Critical measure of change in planning dynamics, closely related to changes in awareness and understanding. It may be a necessary condition for the quality of evaluation of alternatives, recommendations, and action. – Related measures (survey questions): 1a2(18c), 1b1(22g), 1d5(22l), 2b1(17a), 2b2(19a,19b) – Areas for possible future development: Establishing a baseline will be important for assessing degree of change to compare processes (see comments under measure 1a2).

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
2c2. Changes in awareness and understanding Description: Degree to which the collaborative modeling process changed individuals' awareness of other stakeholder goals, objectives, and constraints Focus: planning process outcome (mixed) – Endogenous relative to setting, process characteristics, model quality outcomes, and modeling process outcomes – Exogenous relative to other planning process outcomes	11b. Using the scale below, how do you think the collaborative process you completed would compare with the alternative that you selected in Question 8? The collaborative process made me *more* aware of other stakeholders' interests and objectives. 11A. If you rated any of the above statements [ref. Questions 11a-11f] "strongly disagree," "disagree," or "somewhat disagree," please explain. 14l. Using the scale below, please rate your level of agreement with the following: The process helped me gain a better understanding of the other participants' views and perspectives. 18f. Using the scale below, please rate your level of agreement with the following: As a group, participants gained a better understanding of the nature and magnitude of impacts of different resource management alternatives on interests other than their own. 26g. At this point in time, in very general terms what did this collaborative process accomplish? (Check all that apply): Participants gained a greater appreciation for all of the interests involved	– Interpretation: Critical measure of change in planning dynamics, closely related to change in knowledge. Key measure of immediate outcomes of collaboration. – Related measures (survey questions): 1a2(18c), 1d3(16g), 1d5(22l), 2a3(17h), 2a4(17e), 2b2(19c). 2c4(14n) – Areas for possible future development: Attribution of outcome to modeling process can be inferred. Consider additional questions asking participants the extent to which outcomes can be attributed to modeling process.
2c3. Change in trust Description: Extent to which the collaborative modeling process changed the level of trust among participants and in the validity of the model and its ability to fairly differentiate among management alternatives Focus: planning process outcome (mixed) – Endogenous relative to setting, process characteristics, model quality outcomes, and modeling process outcomes – Exogenous relative to other planning process outcomes	13b. Using the scale below, please rate the extent to which the following conditions were in place…: The participants trusted each other as a result of the process.	– Interpretation: Critical measure of change in planning dynamics, related both to change in confidence in the model (measure 2a4) and changes in knowledge, awareness, and understanding. Key measure of immediate outcome of collaboration. – Related measures (survey questions): 1a3(13a), 2a4(17f), 2b2(19d), 2c11(11d) – Areas for possible future development: Attribution of outcome to modeling process can be inferred. Consider additional questions asking participants the extent to which outcomes can be attributed to modeling process.

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Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
2c4. Change in stakeholder cooperation Description: Extent to which participation in the collaborative modeling process influenced cooperation among stakeholders Focus: planning process outcome (mixed) – Endogenous relative to setting, process characteristics, model quality outcomes, and modeling process outcomes – Exogenous relative to other planning process outcomes	12b. Using the scale below, please rate the extent to which the following conditions were in place…: The participants were able to work together cooperatively as a result of the process. 14n. Using the scale below, please rate your level of agreement with the following: The process helped the participants, as a group, effectively engage to work on the key issues. 14o. Using the scale below, please rate your level of agreement with the following: The participants, as a group, sought options or solutions that met the common needs of all participants.	– Interpretation: Outcome should move in the same direction as change in awareness, understanding, and trust outcomes. Evaluate responses for consistency with theory. Inconsistencies could indicate areas for process improvement. – Related measures (survey questions): 1a3(12a,24a), 1c2(22f), 2b1(18a) – Areas for possible future development: Attribution of outcome to modeling process can be inferred. Consider additional questions asking participants the extent to which outcomes can be attributed to modeling process.
2c5. Change in capacity to communicate Description: Extent to which participation in the collaborative modeling process changed the capacity of stakeholders who participated in model building and use to communicate with other stakeholders and key decision-makers Focus: planning process outcome (mixed) – Endogenous relative to setting, process characteristics, model quality outcomes, and modeling process outcomes – Exogenous relative to other planning process outcomes	18g. Using the scale below, please rate your level of agreement with the following: As a result of my involvement, I was better able to convey relevant information among the stakeholders and/or decision-makers who I represented.	– Interpretation: Key measure of extent to which the process improved the effectiveness of "structured public participation." Compare responses to response relative to consistency between alternatives evaluation and recommendations as measure of effectiveness of information exchange through the representative to the process. – Related measures (survey questions): 1c2(22n), 3b2(5) – Areas for possible future development: Consider direct questions about whether participation in modeling process increased capacity to communicate technical information and trade-offs among interests as well as extent to which increase in capacity to communicate increased the level of trust afforded the representative by other stakeholders.

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Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
2c6. Evolution and clarity of objectives Description: Extent to which the modeling process helped to clarify the objectives of stakeholders, distinguish between facts and values, and focus on objectives rather than on default positions, and extent to which objectives were allowed to and did evolve during the modeling process Focus: planning process outcome (mixed) – Endogenous relative to setting, process characteristics, model quality outcomes, and modeling process outcomes – Exogenous relative to other planning process outcomes	No questions directly address this measure.	– Interpretation: First part of this measure (clarity of objectives) can be inferred by responses to questions related to measures 2c1 and 2c2. – Related measures (survey questions): 2c1(14k,14m,26f), 2c2(11b,14l,26g) – Areas for possible future development: Consider questions regarding: – Extent to which changes in knowledge, awareness, and understanding (as established via measures 2c1 and 2c2) affected the clarity and/or evolution of objectives. – Whether resource management objectives were allowed to and did evolve. – Degree of convergence of opinions regarding the nature and magnitude of alternatives on different interests. – Degree to which participants were able to separate personal value orientations from objectives.
2c7. Agreement level Description: Extent of agreement on a recommended plan Focus: planning process outcome (endogenous)	6. Please indicate the extent to which agreement was reached. (Please choose only one) • Agreement reached on all key issues • Agreement on most key issues • Agreement on some key issues • No agreement on any key issues, but progress was made towards addressing the issues or resolving the conflict (skip to Question 8) • No agreement, we ended the process without making much progress (skip to Question 8) • I was involved in the modeling process only and am not sure of the agreement status (skip to Question 8) • The process is ongoing, and an agreement has yet to be reached (skip to Question 8) 26a. At this point in time, in very general terms what did this collaborative process accomplish? (Check all that apply): A potentially costly or divisive dispute was *likely* avoided.	– Interpretation: Intermediate measure of dispute resolution outcome. Focus on agreement only, not quality of agreement, which is addressed by subsequent measures. – Related measures (survey questions): 1a4(8), 2b3(19f), 2d2(9,10,26i)

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Performance Measure			Associated Survey Question[1,2,3]	Implementation Notes[4]
			26b. At this point in time, in very general terms what did this collaborative process accomplish? (Check all that apply): An impasse (stalemate) was broken.	
			26c. At this point in time, in very general terms what did this collaborative process accomplish? (Check all that apply): A crisis was averted.	
			26d. At this point in time, in very general terms what did this collaborative process accomplish? (Check all that apply): Conflict didn't escalate.	
			26e. At this point in time, in very general terms what did this collaborative process accomplish? (Check all that apply): Costly or protracted litigation was avoided.	
			26k. At this point in time, in very general terms what did this collaborative process accomplish? (Check all that apply): Nothing was accomplished	
			26l. At this point in time, in very general terms what did this collaborative process accomplish? (Check all that apply): The process made the issues or dispute worse.	

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
2c8. Alternatives-recommendation consistency Description: Degree to which the recommended plan was influenced by alternatives evaluated using collaborative modeling Focus: Interpretive measure	19g. Using the scale below, please rate your agreement with the following: The alternatives evaluated using the collaborative modeling process contributed to the development of the recommended plan. 19A. If you rated Question 19g as "strongly disagree," "disagree," or "somewhat disagree," please identify the reason(s) for the lack of continuity between the modeling process and recommended plan. (please choose all that apply): o There was little overlap between the individuals participating in the planning process and the individuals participating in the modeling process o One or more participants in the planning process felt that their interests were not adequately represented in the modeling process o The model rationale and/or results were not clearly understood by those who developed the recommended plan o The model did not account for key information, interests, and/or implementation considerations (e.g., legal constraints) o Model results were not available at the time of the negotiation of the recommendation plan. o Other (please describe)	– Interpretation: Key link for establishing attribution between collaborative modeling and planning processes and changes in quality of recommendations. Also, key measure for providing insights into where seemingly successful processes break down, which will provide insights into critical threats to be addressed in process design and implementation. – Related measures (survey questions): 1b2(all), 1d4(all), 2a1(all), 2a2(NA), 2a3(16i), 2a4(all), 2b1(all), 2b2(all), 2c1(all), 2c2(all), 2c3(all), 2c5(18g)
2c9. Quality of recommendations Description: Stakeholders' perceptions regarding the degree to which recommendations addressed and fairly balanced their objectives against others; analog to "agreement" in ECR evaluation Focus: planning process outcome (endogenous)	7a. Using the scale below, rate the following statements regarding the agreement (as referred to in Question 6): The extent to which you feel the agreement reached takes account of all key interests. 7b. Using the scale below, rate the following statements regarding the agreement (as referred to in Question 6): The extent to which you feel that the agreement reached takes account of your key interests.	– Interpretation: Measure of the quality of the agreement reached as a result of the collaborative modeling and planning processes. Link to measures of stakeholder representativeness in the process to provide deductive measure of quality. – Related measures (survey questions): 1a4(8), 1b2(all), 2a1(all), 2b1(all), 2b2(all), 2b3(19f), 2c7(6) – Areas for possible future development: Attribution of outcome to modeling process can be inferred.

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Performance Measure			Associated Survey Question[1,2,3]	Implementation Notes[4]
			7c. Using the scale below, rate the following statements regarding the agreement (as referred to in Question 6): The extent to which the agreement reached will effectively solve the problem/resolve the conflict.	Consider additional questions asking participants the extent to which outcomes can be attributed to modeling process.
			7d. Using the scale below, rate the following statements regarding the agreement (as referred to in Question 6): The extent to which you are confident the agreement can be implemented	
			7A. If you rated any of the above statements [ref. Questions 7a-7d] "not at all," "to a very little extent," or "to a little extent," please explain.	
			11a. Using the scale below, how do you think the collaborative process you completed would compare with the alternative that you selected in Question 8? The results of the collaborative process *better* served the interests of the participants.	
			11c. Using the scale below, how do you think the collaborative process you completed would compare with the alternative that you selected in Question 8? The results of the collaborative process are *less likely* to be challenged.	
			11e. Using the scale below, how do you think the collaborative process you completed would compare with the alternative that you selected in Question 8? The collaborative process we participated in *more effectively* addressed the issues or resolved the conflict.	
			11f. Using the scale below, how do you think the collaborative process you completed would compare with the alternative that you selected in Question 8? The collaborative process we participated in led or will lead to a *more informed* public action/decision.	
			11A. If you rated any of the above statements [ref. Questions 11a-11f] "strongly disagree," "disagree," or "somewhat disagree," please explain.	

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Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
2c10. Action level Description: Extent to which management actions have been undertaken along a continuum from selection of a plan, commitment to act to degree to which actions have been implemented Focus: post-planning outcome (endogenous)	No questions directly address this measure	– Interpretation: Action level can be inferred from information regarding agreement level (measure 2c7) and research of documentation of the process identified in question 1 of the survey. Controlling for institutional context will be critical when inferring relationships between planning and action outcomes. – Related measures (survey questions): 2c7(6), 3a1(1) – Areas for possible future development: Consider direct questions about action level.
2c11. Action-recommendation consistency Description: Degree to which actions were consistent with the recommendations that resulted from the modeling process Focus: interpretive measure	19h. Using the scale below, please rate your agreement with the following: Actions taken (or planned) to address the resource management issue are consistent with the recommended plan. 19B. If you rated Question 19h as "strongly disagree," "disagree," or "somewhat disagree," please identify the reason(s) for inconsistency between actions taken (or planned) and the recommended plan. o Alternative recommendations that came from sources outside of the collaborative planning process were used (or will be used) as the basis for action o One or more participants in the collaborative planning process developed alternative recommendations after the process was complete that were used (or will be used) as the basis for action o New information and/or key interests were identified but the process was not reconvened o Legal constraints were identified that required a different planning approach and different actions o Agreements required by the recommended plan were too complex o Too much time passed between the conclusion of the planning process and action o Other (please describe)	– Interpretation: Key link for establishing attribution between collaborative modeling and planning processes, changes in quality of recommendations, and changes in quality of resource management actions. Also, key measure for providing insights into where seemingly successful processes break down, which will provide insights into critical threats to be addressed in process design and implementation. – Related measures (survey questions): 2b2(19e), 2c8(19A), 2c9(all)

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
	28. From your perspective, what will be the long-term effect(s) (e.g., positive or negative impacts) of the collaborative process? o Natural resources and environmental conditions o Historic and cultural resources o Community and social conditions o Economic conditions o Recreational uses o Other (please specify)	
2c12.Quality of Actions Description: Stakeholders' perceptions regarding the quality of resource management actions and deductions from other measures regarding consistency with recommendations developed through representative process. Focus: post-planning outcome (endogenous)	No questions directly address this measure	– Interpretation: Link to measures of stakeholder representativeness in the process and quality of recommendations to provide deductive measure of quality of actions. – Related measures (survey questions): 1b2(all), 2a1(all), 2b2(all), 2c8(all), 2c9(all), 2c10(all), 2c11(all) – Areas for possible future development: Consider counterfactual questions relative to question 8 (measure 1a4), such as perceptions regarding whether: quality of actions was improved, interests better served, and actions are less likely to be challenged.
2c13. Institutional learning and change Description: Evidence of institutional or organizational change that resulted from participation of decision-makers and key stakeholders in the collaborative modeling and planning process Focus: planning process outcome (endogenous)	11d. Using the scale below, how do you think the collaborative process you completed would compare with the alternative that you selected in Question 8? The participants are *more likely* to be able to work together in the future on matters related to this case or project. 11A. If you rated any of the above statements [ref. Questions 11a-11f] "strongly disagree," "disagree," or "somewhat disagree," please explain. 26h. At this point in time, in very general terms what did this collaborative process accomplish? (Check all that apply): Relationships among parties in this process were improved.	– Interpretation: Long-term institutional effects can be inferred based on participants responses and their associations with institutions. – Related measures (survey questions): 1a3(all), 2c3(13b), 2c4(12b) – Areas for possible future development: – Further development of questions related to level of conflict at institutional scale and institutional context (ref. comments under measures 1a3 and 1a4) could strengthen this measure. – Consider other evidentiary measures, such as whether institutions have participated in other collaborative processes following the subject

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
	26j. At this point in time, in very general terms what did this collaborative process accomplish? (Check all that apply): Participants agreed to work together to address future problems/resolve future conflicts in a collaborative manner	process and/or whether they have entered into formal collaboration-focused agreements.
2c14. Adaptive management capacity Description: Extent to which collaborative modeling and planning processes created conditions conducive to adaptive management and/or led to the adoption of adaptive management practices Focus: planning process outcome (endogenous)	No questions directly address this measure.	– Related measures (survey questions): 2c13(all) – Areas for possible future development: Consider measures regarding: – Extent to which the plan provides workable means for adapting to unanticipated circumstances or changed conditions. – Extent to which the collaborative modeling process created a computational environment that will support adaptive management. – Extent to which the model can be customized to incorporate new information.
2d. Process satisfaction, cost, and duration measures (focus: measures to help evaluate satisfaction with the processes and implications of collaborative processes in terms of resources expended and duration.		
2d1. Satisfaction with process Description: Participants' satisfaction with the collaborative planning and modeling processes Focus: interpretive measure	25a. Using the scale below, please rate your agreement with the following statements: I would recommend this type of process to my colleagues in a similar situation without hesitation.	– Interpretation: Questions will provide data to help interpret other responses and provide supportive evidence regarding conclusions about process outcomes.
	25b. Using the scale below, please rate your agreement with the following statements: We could not have progressed as far using any other process of which I am aware.	
	25c. Using the scale below, please rate your agreement with the following statements: The process would not have achieved as much without the use of collaborative modeling.	
	27. What is your top suggestion on how this collaborative process could have been improved? (Please write "none" if you feel this process could not have been improved)	

Suite of Performance Measures and Relationship to Survey Instrument
Performance Measures to Assess the Benefits of Collaborative Modeling

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
2d2. Process costs and duration Description: Impact of collaborative processes on cost and duration. Focus: interpretive measure	9. Please consider how the collaborative process you completed compares with the alternative that you identified in the Question 8, and then check the most appropriate of the following: (please choose only one) • I feel the collaborative process was *less expensive*….and this level of expenditure was appropriate. • I feel the collaborative process was *less expensive*…but additional resources we probably needed. • I feel the collaborative process *cost more*…. and the extra costs *were worth* the investment. • I feel the collaborative process *cost more*…and the extra costs were *not* worth the investment. • Don't know	– Interpretation: Questions will provide data to analyze whether there are trade-offs between changes in resource requirements and quality of outcomes, under what circumstances, and the nature of those trade-offs.
	10. Please consider how the collaborative process you completed compares with the alternative that you identified in Question 8, and then check the most appropriate of the following: (please choose only one) • I feel the collaborative process took *less time*…and this duration was appropriate. • I feel the collaborative process took *less time*… but additional time was probably needed. • I feel the collaborative process took *more time*… and the extra time *was worth* the investment. • I feel the collaborative process took *more time*…and the extra time was *not* worth the investment. • Don't know	
	14j. Using the scale below, please rate your level of agreement with the following: The overall duration of the process had a negative effect on the collaborative process	
	26i. At this point in time, in very general terms what did this collaborative process accomplish? (Check all that apply): The process resulted in timely decisions and outcomes	

Suite of Performance Measures and Relationship to Survey Instrument
Performance Measures to Assess the Benefits of Collaborative Modeling

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
3. Instrument-Level Measures. Purpose: to be included in data collection instruments (e.g., surveys, interviews) to provide background on respondent/data source to enable interpretation of data (e.g., explain differences in data in terms of different perspectives, elucidate secondary findings based on these differences, etc.).		
3a. Background		
3a1. Process identity Description: Identity of process about which respondent is completing the survey. Focus: interpretive measure	1. Please identify the name of the collaborative process for which you are completing this survey.	– Interpretation: Identity of process will enable evaluation to include other sources of information.
3b. Respondent perspective		
3b1. Institutional perspective Description: Institutional perspective of survey respondent Focus: interpretive measure	2. Which category best describes the interest or organization you represented in this process? (check the most appropriate answer only) • Federal Government • State Government • Local/Regional Government • Tribal Government • Environmental/Conservation • Recreational • Industrial/Resource Extraction • Business/Commercial • Community or Private Citizen (e.g., neighborhood association, local resident) • Special Advocacy Interests (Please specify) • Other (Please specify)	– Interpretation: Question will help identify and control for correlation between institutional perspective and responses to other questions. – Areas for possible future development: Consider m.

Suite of Performance Measures and Relationship to Survey Instrument
Performance Measures to Assess the Benefits of Collaborative Modeling

Performance Measure	Associated Survey Question[1,2,3]	Implementation Notes[4]
3b2. Participation in process Description: Description of participation of survey respondent in process about which respondent is completing the survey. Focus: interpretive measure	4. Using the scale below, please identify the different aspects of the process in which you were involved and rate your level of involvement: a. Planning process (overall) b. Modeling process (overall) c. Planning process design d. Modeling process design e. Problem formulation f. Fact finding g. Discussions/negotiations with other parties regarding alternatives h. Coordination of other stakeholder input i. Model development j. Evaluation of alternatives k. Development of recommendations l. Monitoring the implementation of the agreement m. Other (please describe)	– Interpretation: Questions will support analyses based on different types and levels of involvement in different aspects of the process.
	4Aa. If you answered [in response to Question 4] that you were "somewhat involved" or "very involved" in the planning process overall, please provide the following descriptive information about the planning process: What was your role in the process?	
	4Ba. If you answered [in response to Question 4] that you were "somewhat involved" or "very involved" in the modeling process overall, please provide the following descriptive information about the modeling process: What was your role in the process?	

Suite of Performance Measures and Relationship to Survey Instrument
Performance Measures to Assess the Benefits of Collaborative Modeling

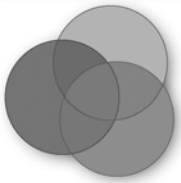
Performance Measure			Associated Survey Question[1,2,3]	Implementation Notes[4]
			5. As a representative of your organization, what was your role in communicating with others who were not as directly involved in the process? (Check all that apply) o I was responsible for conveying information among stakeholders within my organization o I was responsible for conveying information among stakeholders outside of my organization (please describe o I had authority to make some decisions on behalf of my organization o I had authority to make all decisions on behalf of my organization Other (please describe)	
			15. Please identify your level of familiarity and/or involvement in the model development, testing, and/or application: (please choose only one) • I was involved in at least one aspect of the modeling process (e.g., identifying objectives, identifying variables and relationships, testing the model, etc.) • I was not directly involved but am familiar enough with the modeling process to answer questions about it • I was not involved and am not familiar enough with the modeling process to answer questions about it (skip to Question 17)	

[1] The following scales are used for the following questions:
- Question 3: 4-point level of priority scale: highest priority, relatively high priority, relatively low priority, not a consideration.
- Question 4: 4-point level of involvement scale: not involved, involved very little, somewhat involved, very involved.
- Questions 4C, 11-14, 16-19, and 22-25: 6-point level of agreement scale: strongly disagree, disagree, somewhat disagree, somewhat agree, agree, strongly agree.
- Question 7: 6-point level of extent scale: not at all, to a very little extent, to a little extent, to some extent, to a great extent, to a very great extent.

[2] In the survey form, several questions are accompanied by explanatory text to help the respondent interpret the question. Explanatory text is not included in this table for brevity. Refer to survey (Attachment A) for full questions, including explanatory text.

[3] Note that Questions 20 and 21 from the survey are not included in this table, as these questions are primarily used to create the logic to allow for multiple responses to Question 22.

[4] Implementation notes included in this table provide a summary of key considerations for interpretation of data associated with this measure, related questions that could be used to gain insights and improve interpretation, and areas for possible future development. More detailed discussions of these issues are provided in the body of the report.



Shared Vision Planning

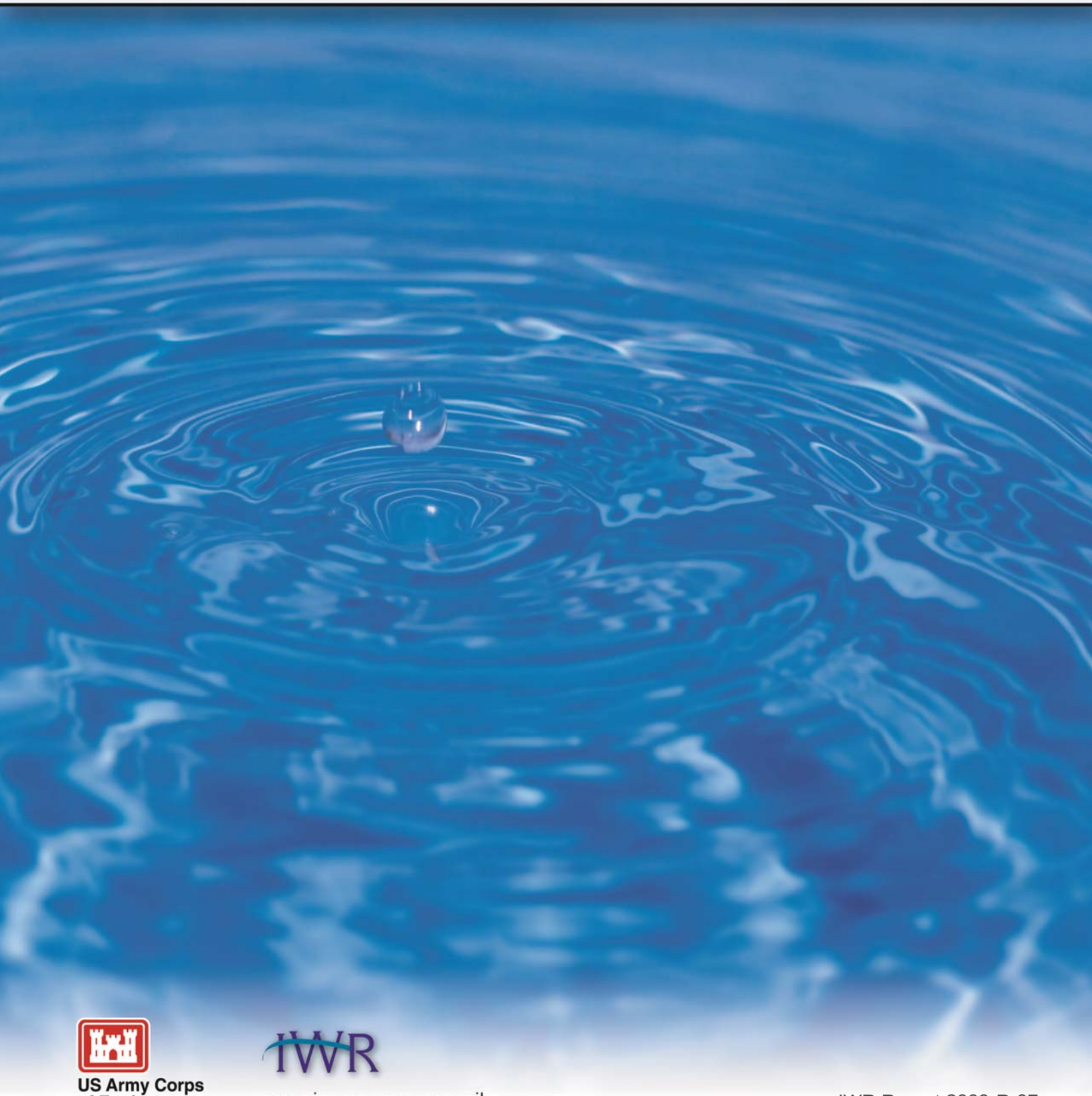
The History of Shared Vision Planning

The Shared Vision Planning approach began in response to the U.S. Army Corps of Engineers need to revise water management strategies on the Potomac River in the late 1970s. The Interstate Commission on the Potomac River Basin made public participation a key feature of its planning process to more effectively manage water supplies in the D.C. metro area.

In 1988, in response to severe droughts across the United States, the Corps undertook the National Study of Water Management During Drought (known as the National Drought Study) to examine and improve water management practices nationwide. The method developed in this project's case studies evolved into the planning approach now known as Shared Vision Planning. The "Drought Preparedness Method," as it was named during the National Drought Study, emphasized preparedness, stakeholder involvement, and the use of collaboratively developed computer models, which remain the core aspects of Shared Vision Planning today.

Shared Vision Planning and its particular method have been applied to a number of case studies since the National Drought Study, thereby refining the process and increasing Corps scientists' familiarity with it. The Lake Ontario-St. Lawrence River Study, the James River Basin Study, and the Rappahannock River Basin Commission Water Supply Planning Project are just a few of the projects that have benefited from the Corps use of Shared Vision Planning.

To further explain the concept and method of Shared Vision Planning, and educate the wider resources planning community, IWR has created a new Shared Vision Planning web site. We invite you to visit the site at http://www.svp.iwr.usace.army.mil to learn more about this collaborative planning approach.



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